

Is the Drought Over?

Comparing the Deschutes and Crooked Rivers



Jason Gritzner



Lisa Seales



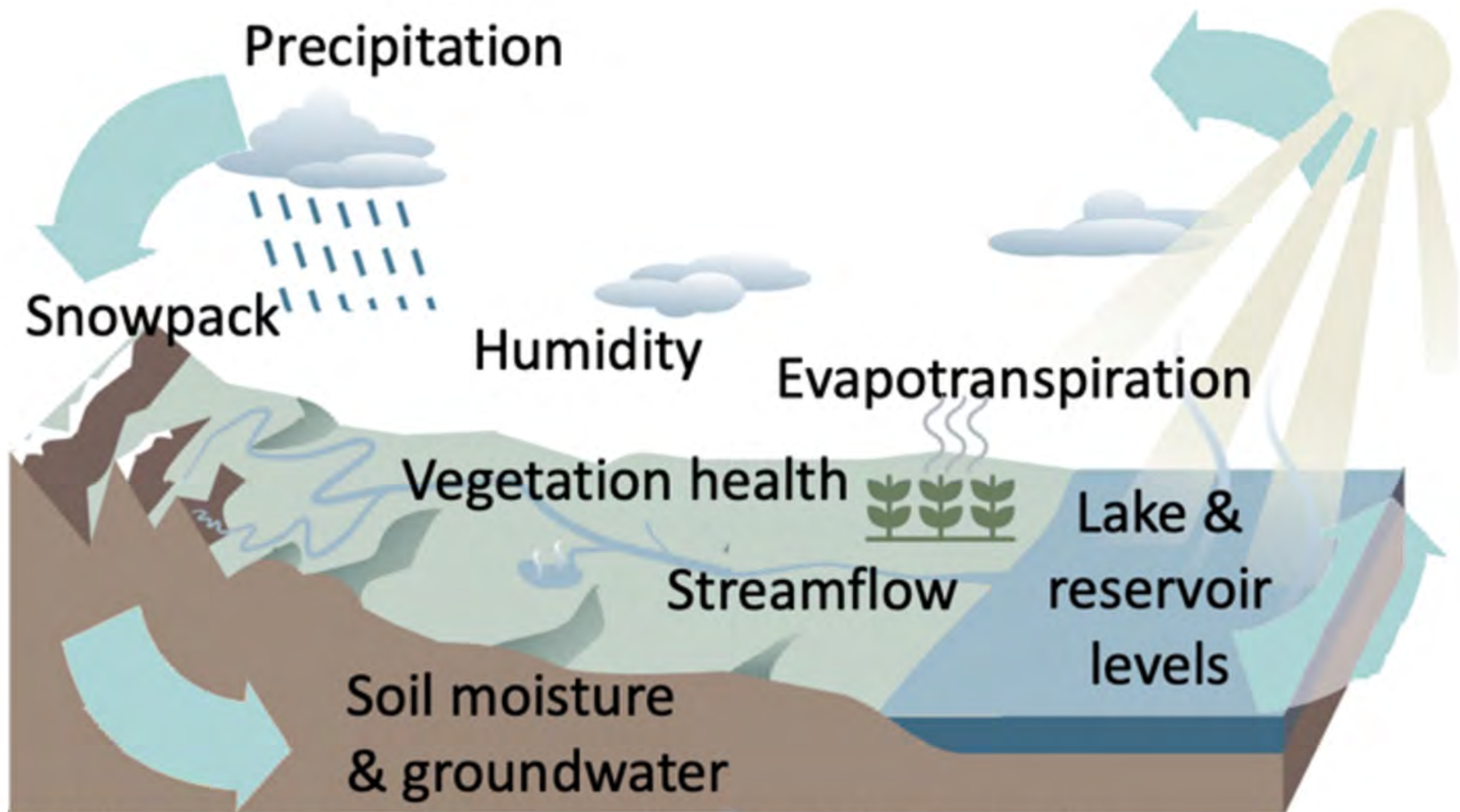
DESCHUTES RIVER
CONSERVANCY

A photograph of a dry, cracked riverbed. The ground is parched and covered in a network of deep, irregular cracks. A large, weathered log lies horizontally across the middle of the frame. The banks are lined with tall, dry grasses and some green vegetation. In the background, there are more trees and a hilly landscape under a clear sky.

Overview

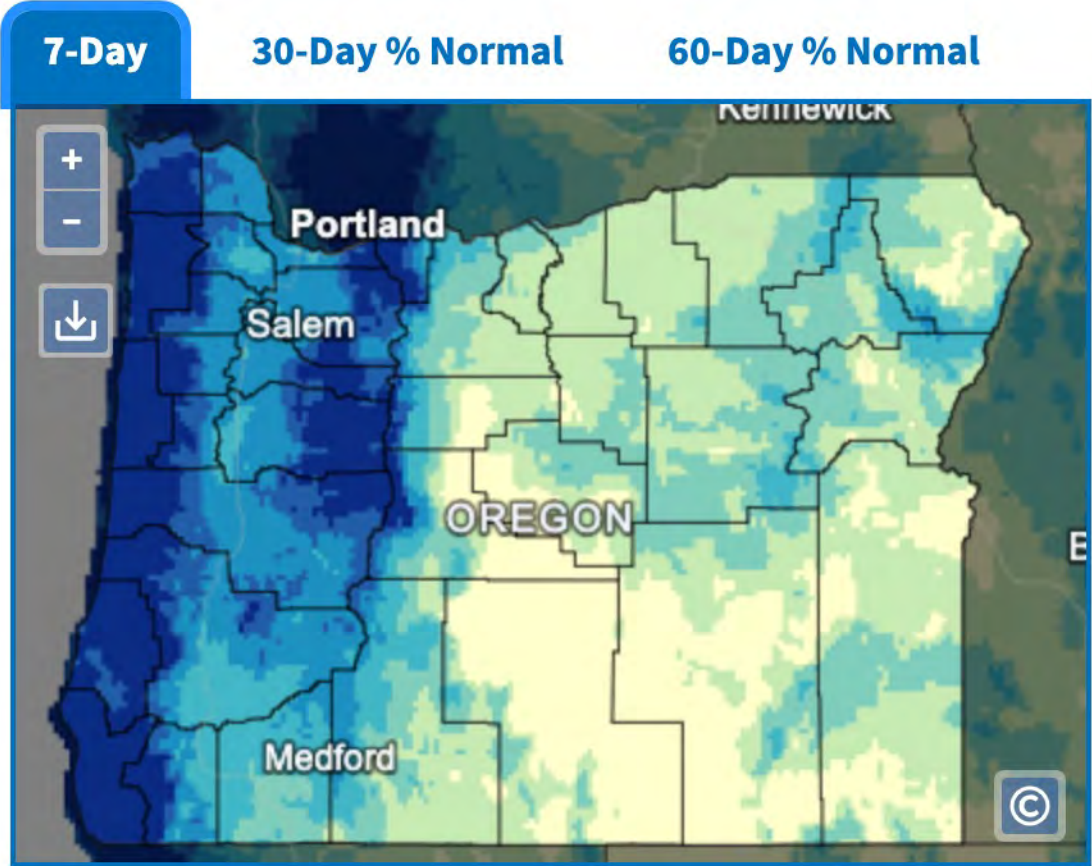
- What is drought?
- How and why drought and weather events impact the Crooked and Deschutes rivers differently
- How we are building resiliency





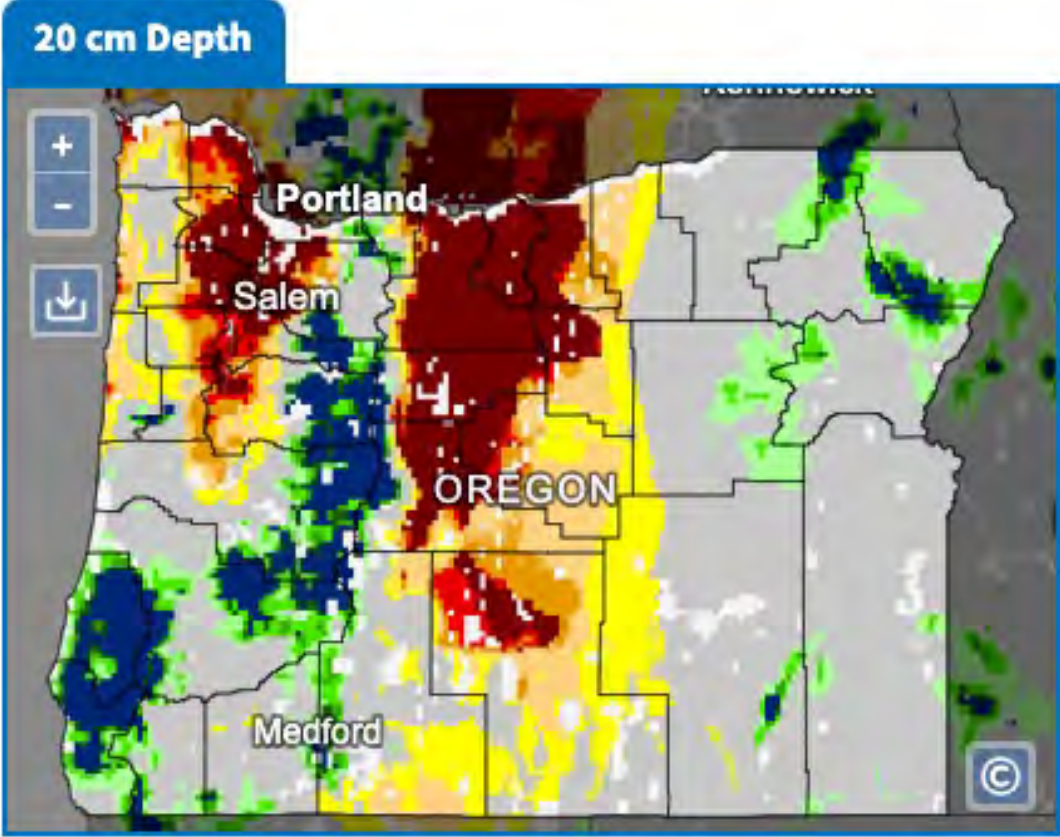
The USDM incorporates several types of physical data, at all different time scales, beyond just rain and snow.

Precipitation vs Soil Moisture for Monday, December 11, 2023



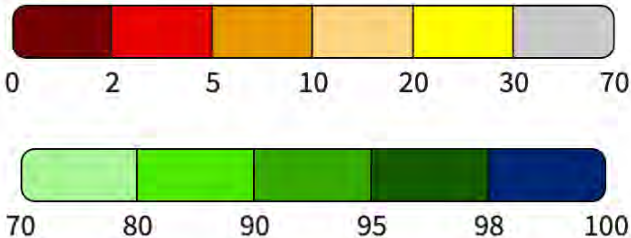
Legend —

Inches of Precipitation



Legend —

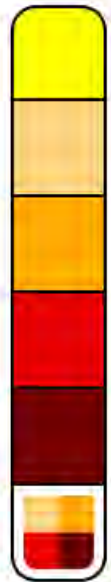
20 cm Soil Moisture Percentile



U.S. Drought Monitor

Legend

Drought & Dryness Categories



D0 – Abnormally Dry

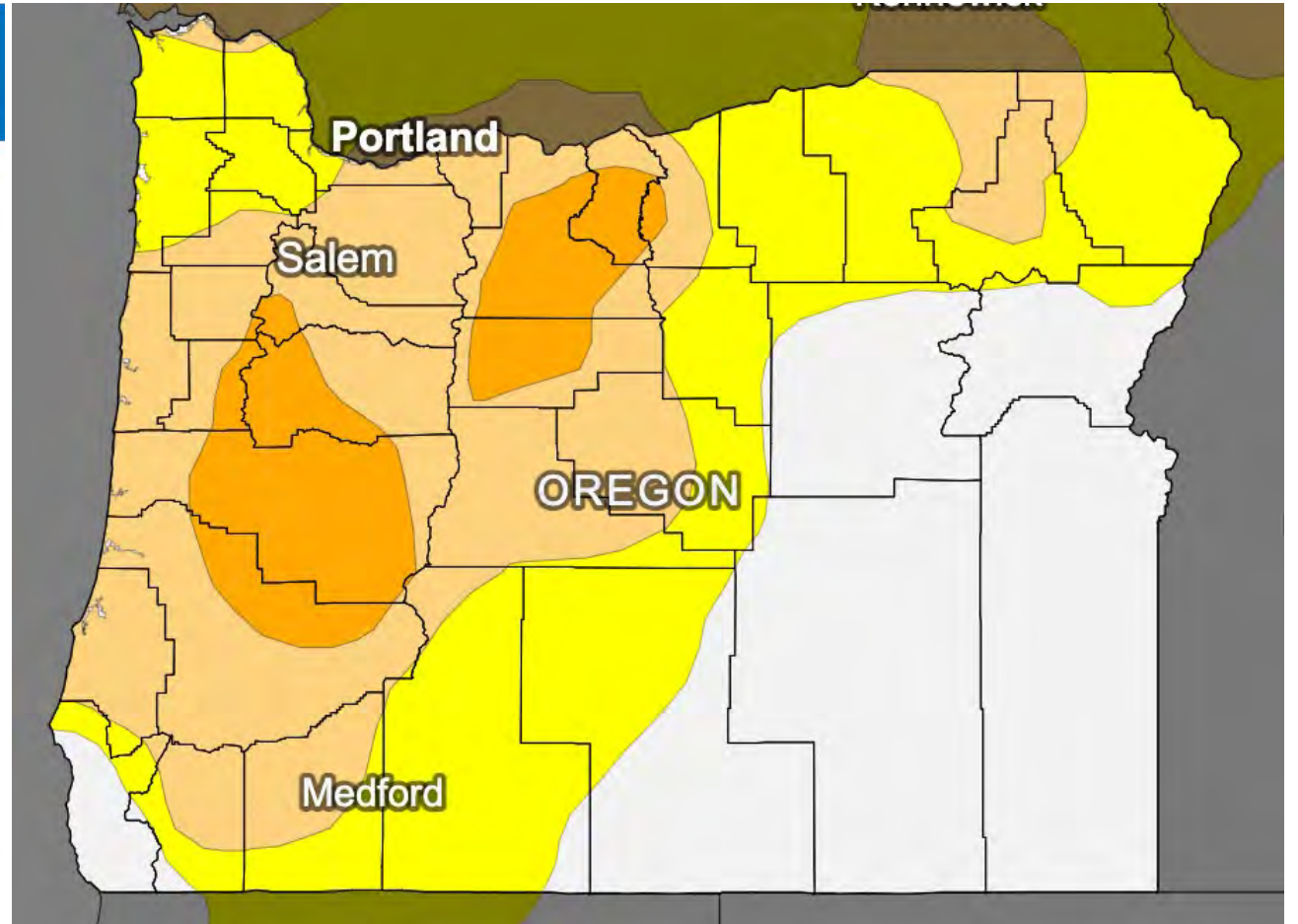
D1 – Moderate Drought

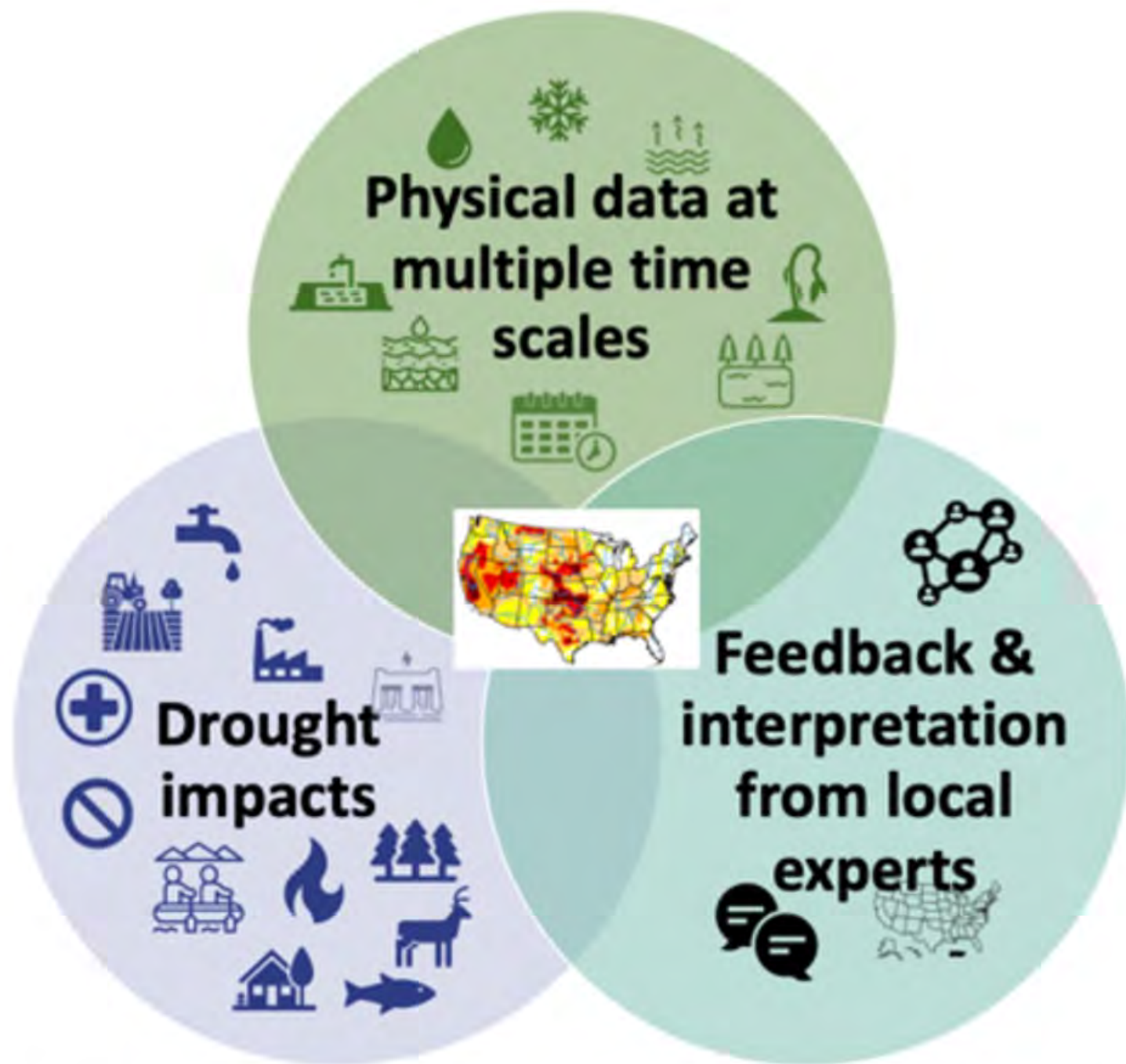
D2 – Severe Drought

D3 – Extreme Drought

D4 – Exceptional Drought

Total Area in Drought (D1–D4)

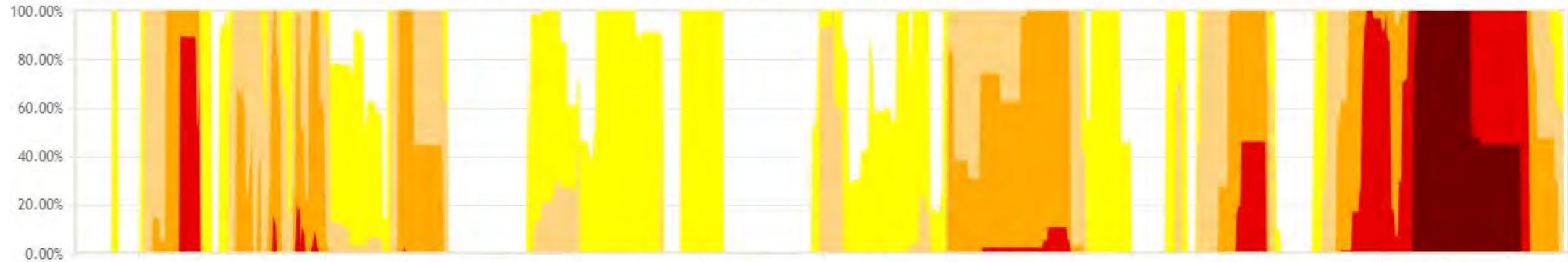




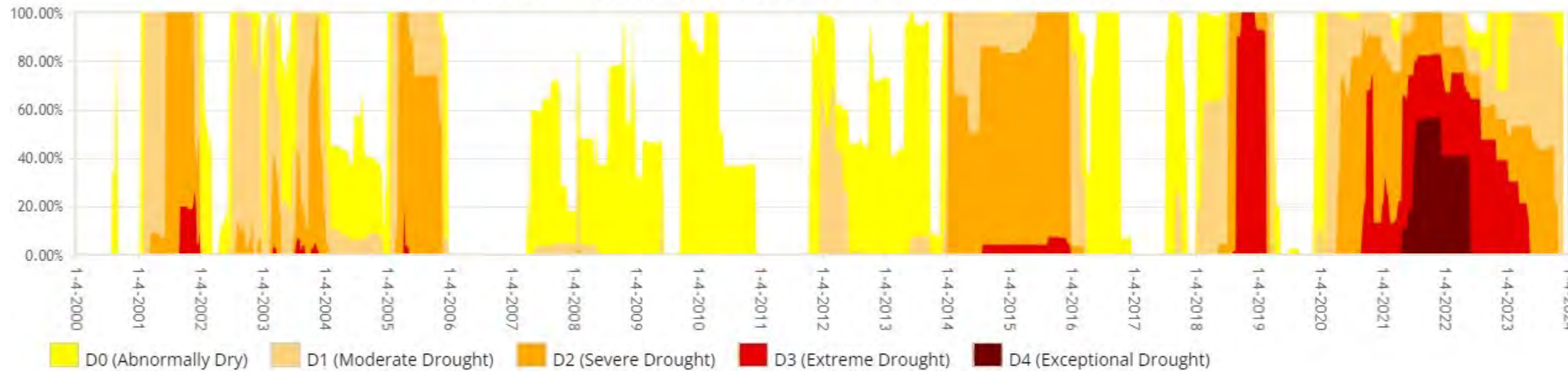
2023 Oregon Drought Declarations



Crook County (OR) Percent Area in U.S. Drought Monitor Categories



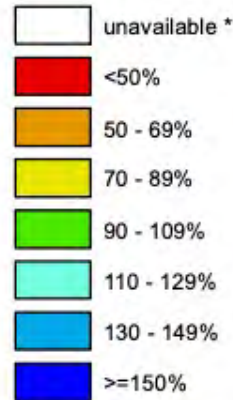
Deschutes County (OR) Percent Area in U.S. Drought Monitor Categories



Oregon SNOTEL Current Snow Water Equivalent (SWE) % of Normal

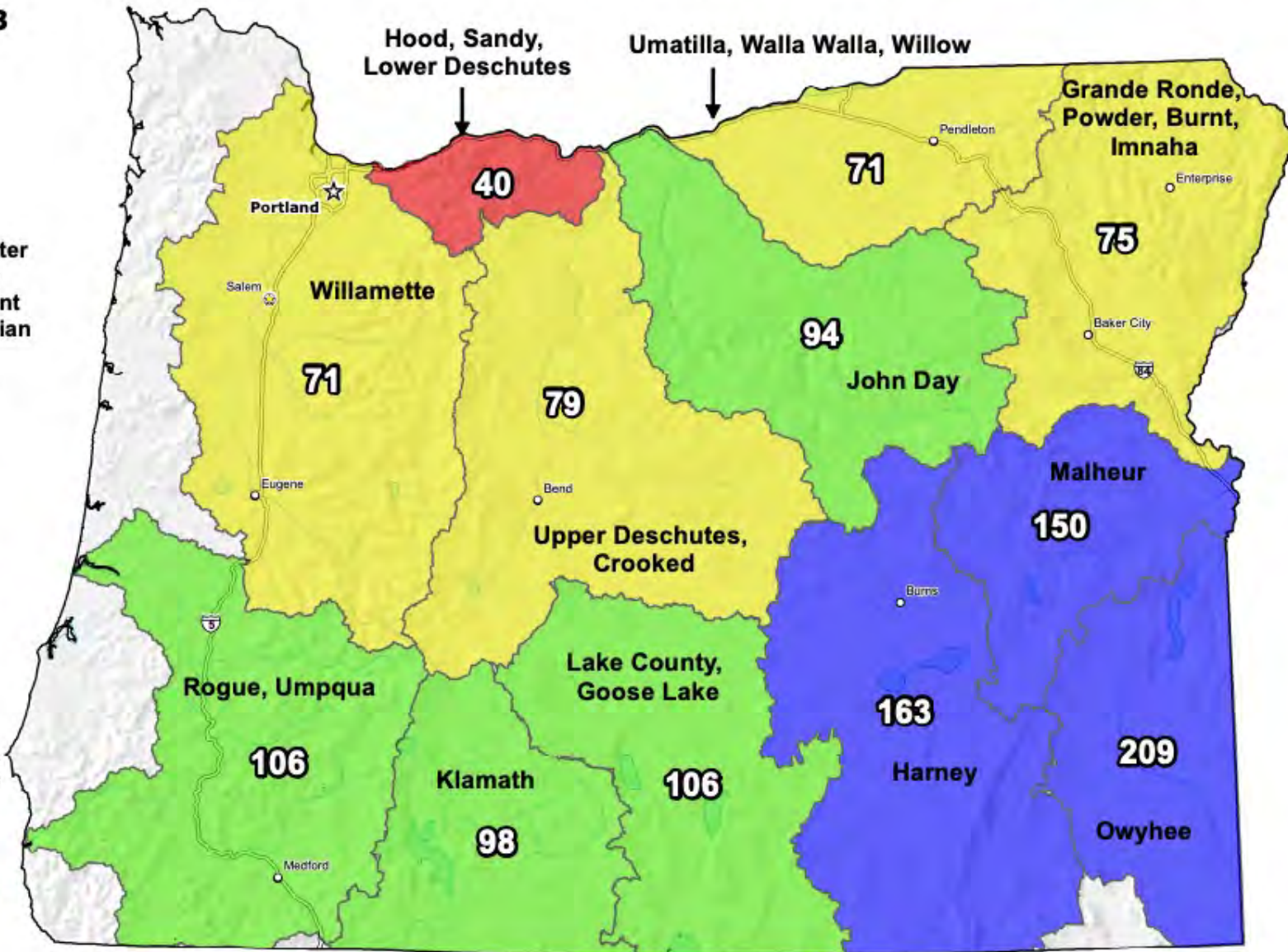
Dec 08, 2023

Current Snow Water Equivalent (SWE) Basin-wide Percent of 1991-2020 Median



* Data unavailable at time of posting or measurement is not representative at this time of year

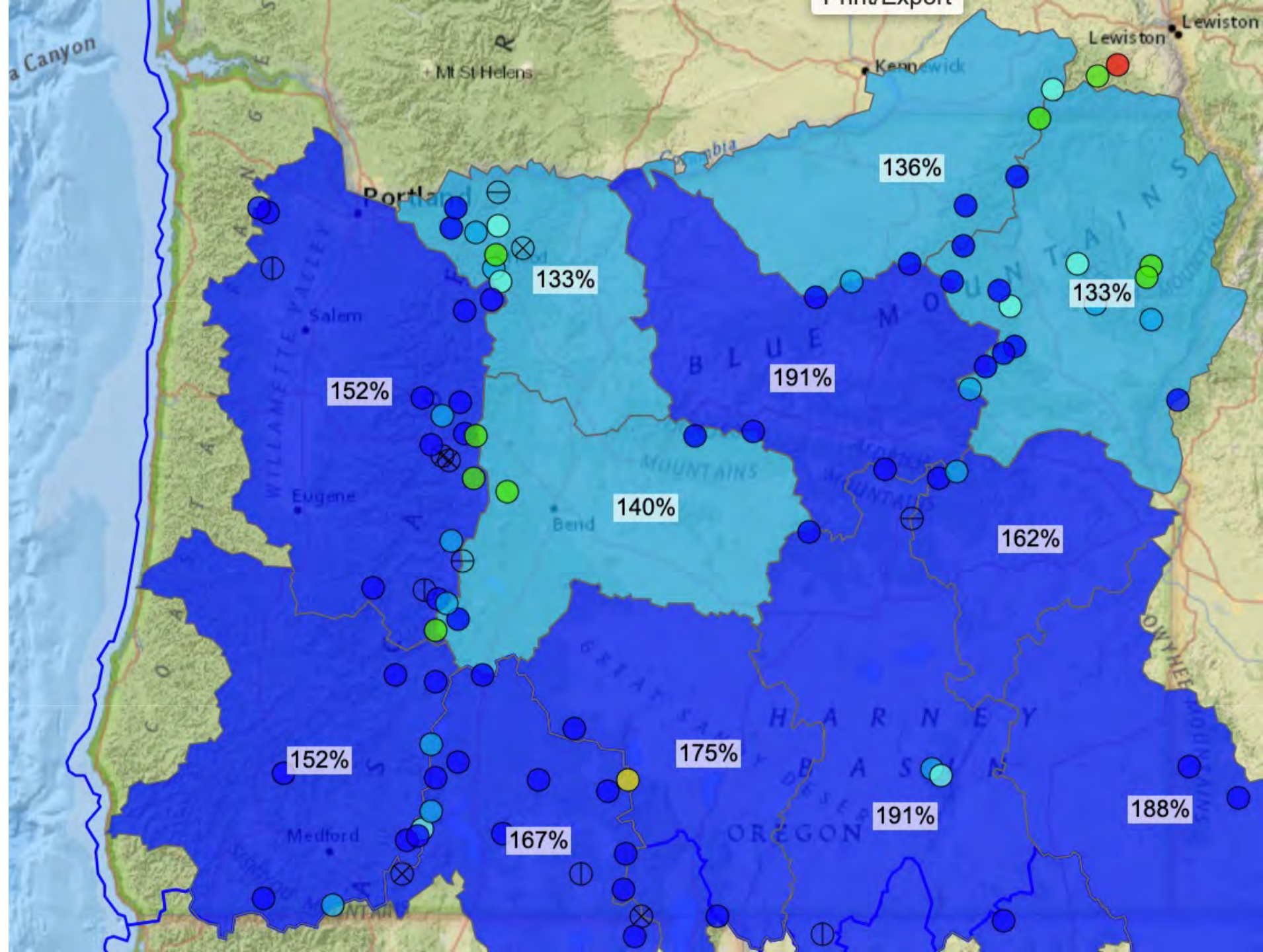
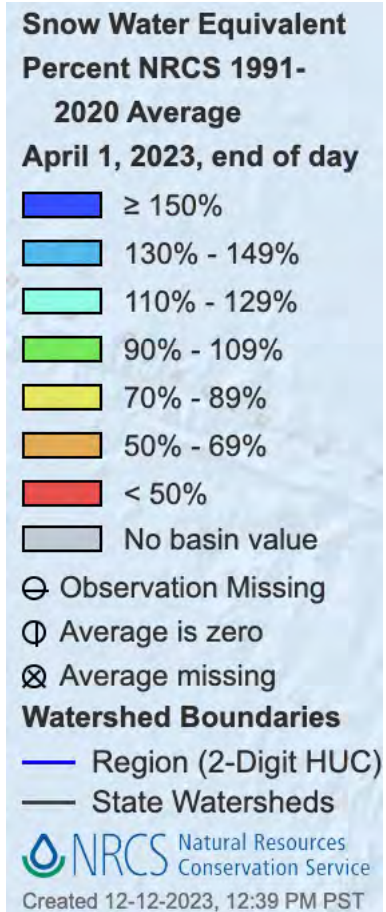
Provisional Data
Subject to Revision



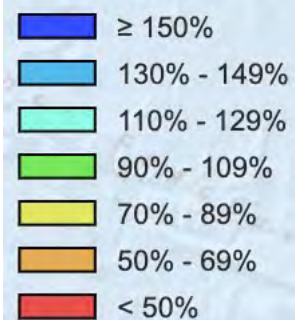
The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

0 10 20 40 60 80 100 Miles

Prepared by:
USDA/NRCS National Water and Climate Center
Portland, Oregon
<https://www.nrcs.usda.gov/wps/portal/wcc/home/>



**Water Year to Date
Precipitation
Percent NRCS 1991-
2020 Average
October 1, 2022 through
April 1, 2023**



No basin value

⊖ Observation Missing

⊕ Average is zero

⊗ Average missing

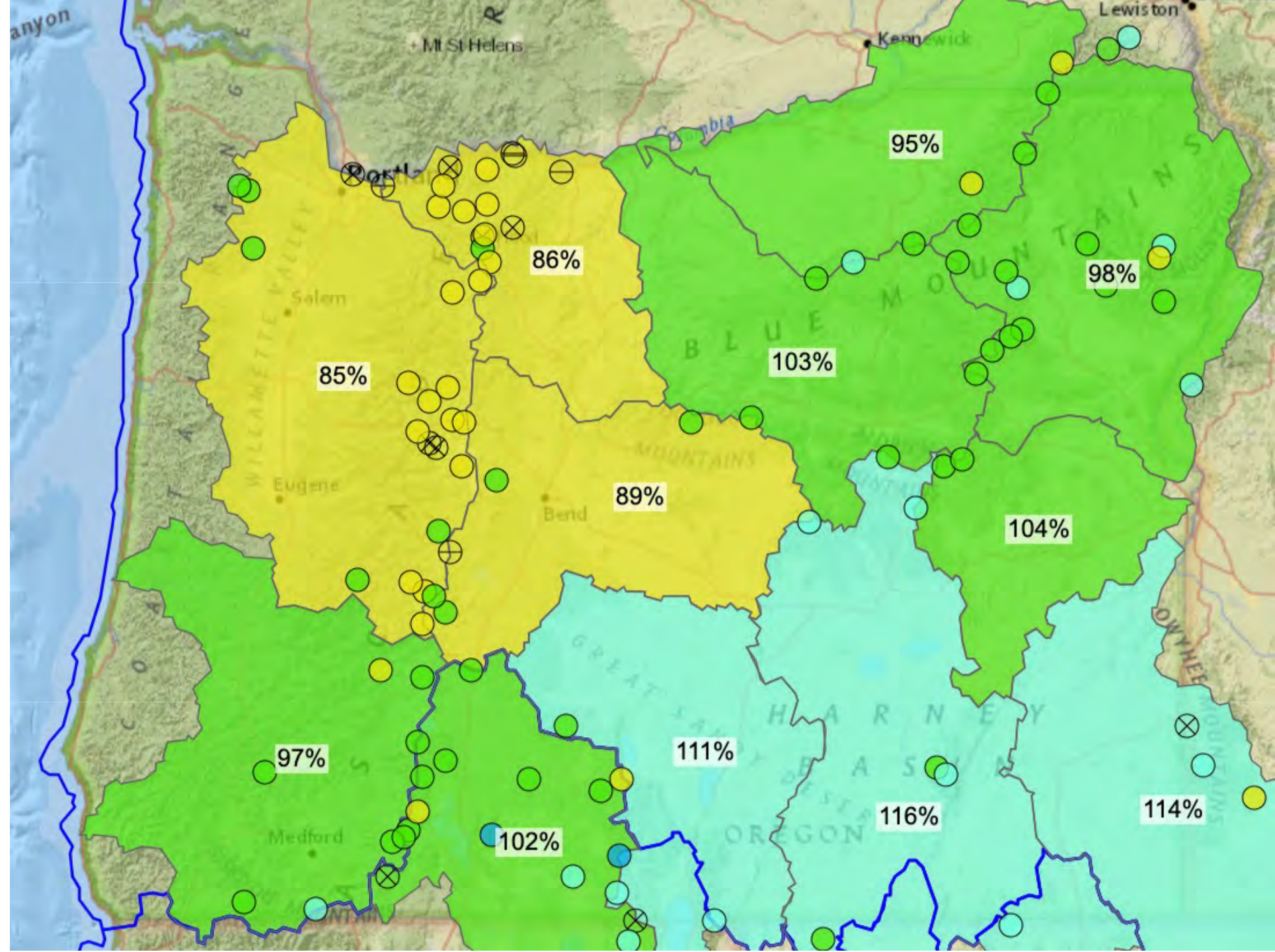
Watershed Boundaries

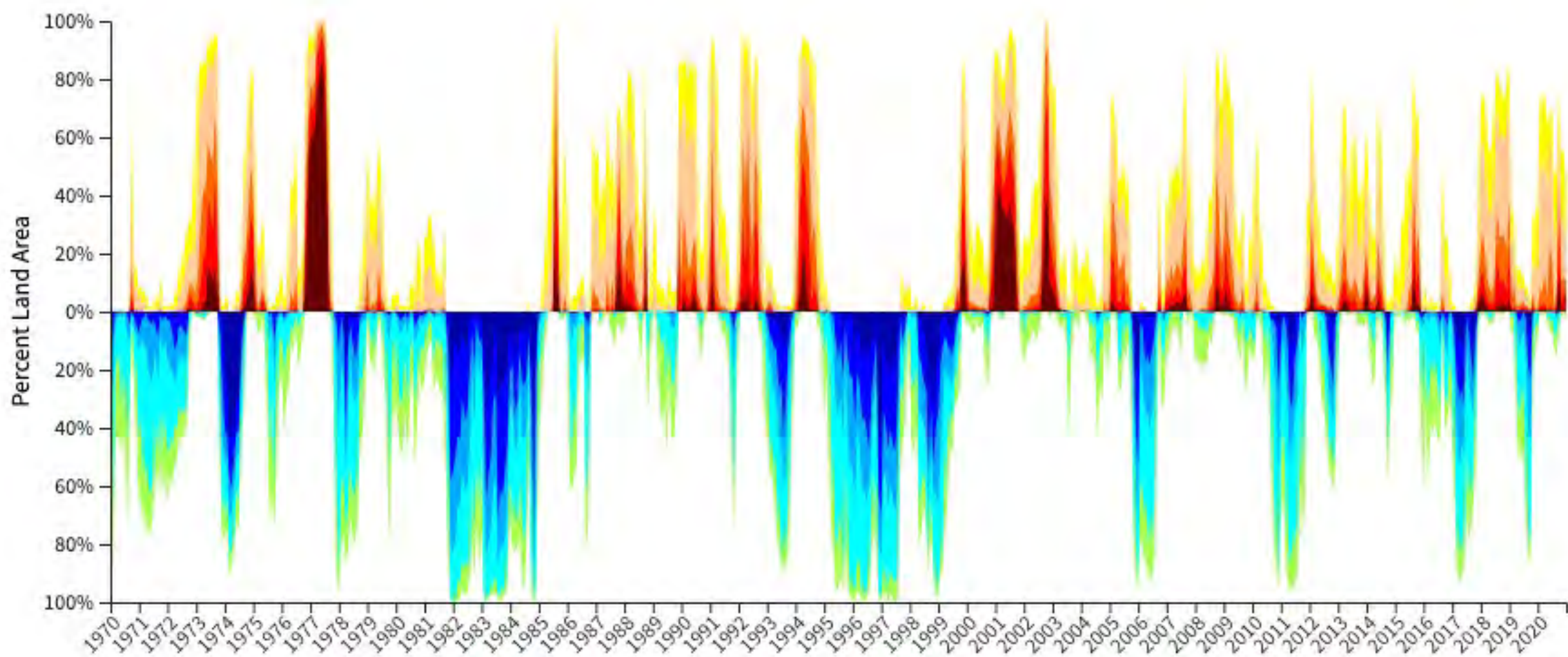
— Region (2-Digit HUC)

— State Watersheds



Created 12-12-2023, 02:36 PM PST





**Snow Water Equivalent
Percent NRCS 1991-
2020 Average**

May 20, 2023, end of day



⊖ No basin value

⊖ Observation Missing

⊖ Average is zero

⊗ Average missing

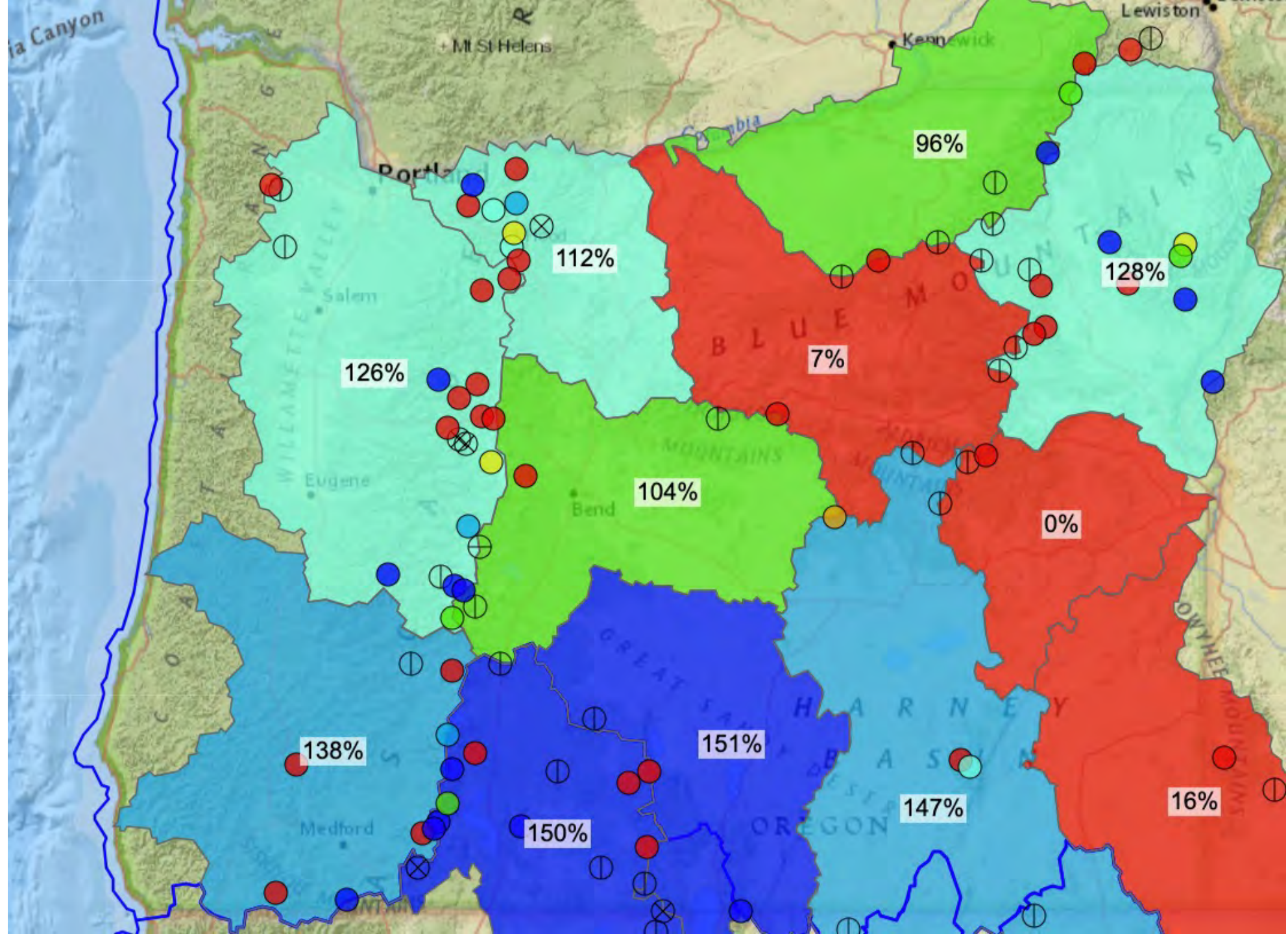
Watershed Boundaries

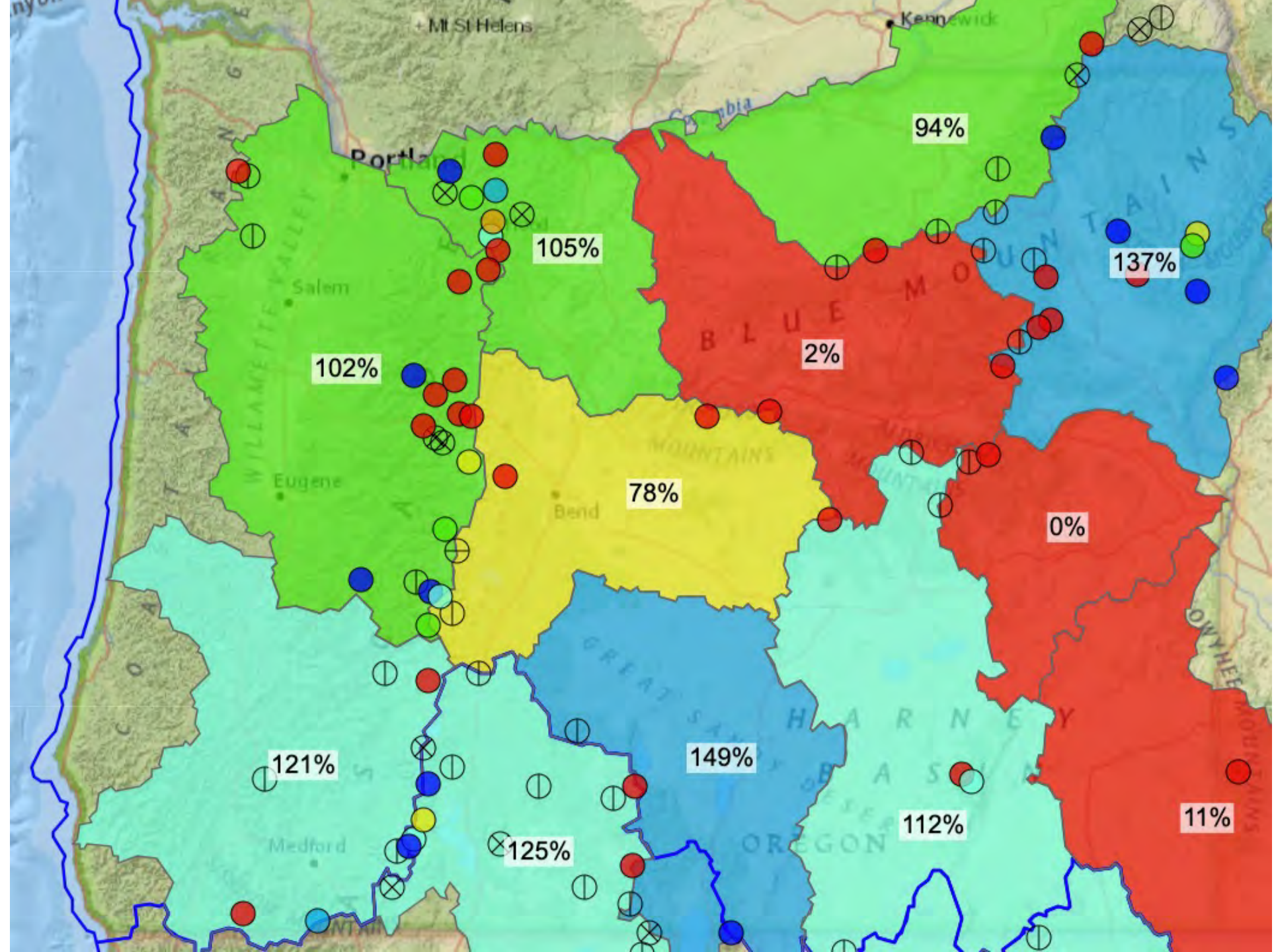
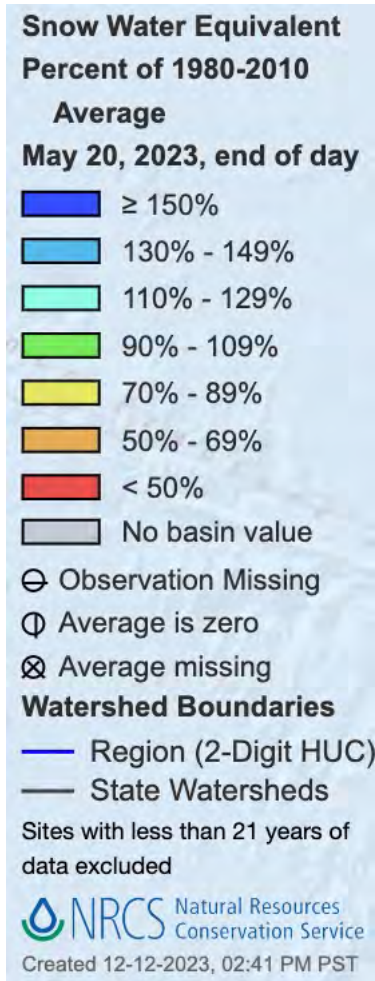
— Region (2-Digit HUC)

— State Watersheds

 **NRCS** Natural Resources
Conservation Service

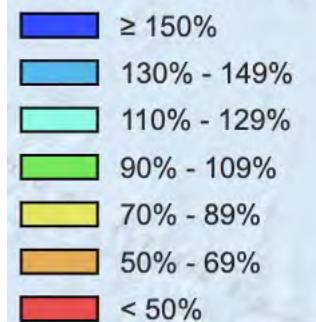
Created 12-12-2023, 02:40 PM PST





Snow Water Equivalent Percent of 1970-2000

**Average
May 20, 2023, end of day**



No basin value

⊖ Observation Missing

⊕ Average is zero

⊗ Average missing

Watershed Boundaries

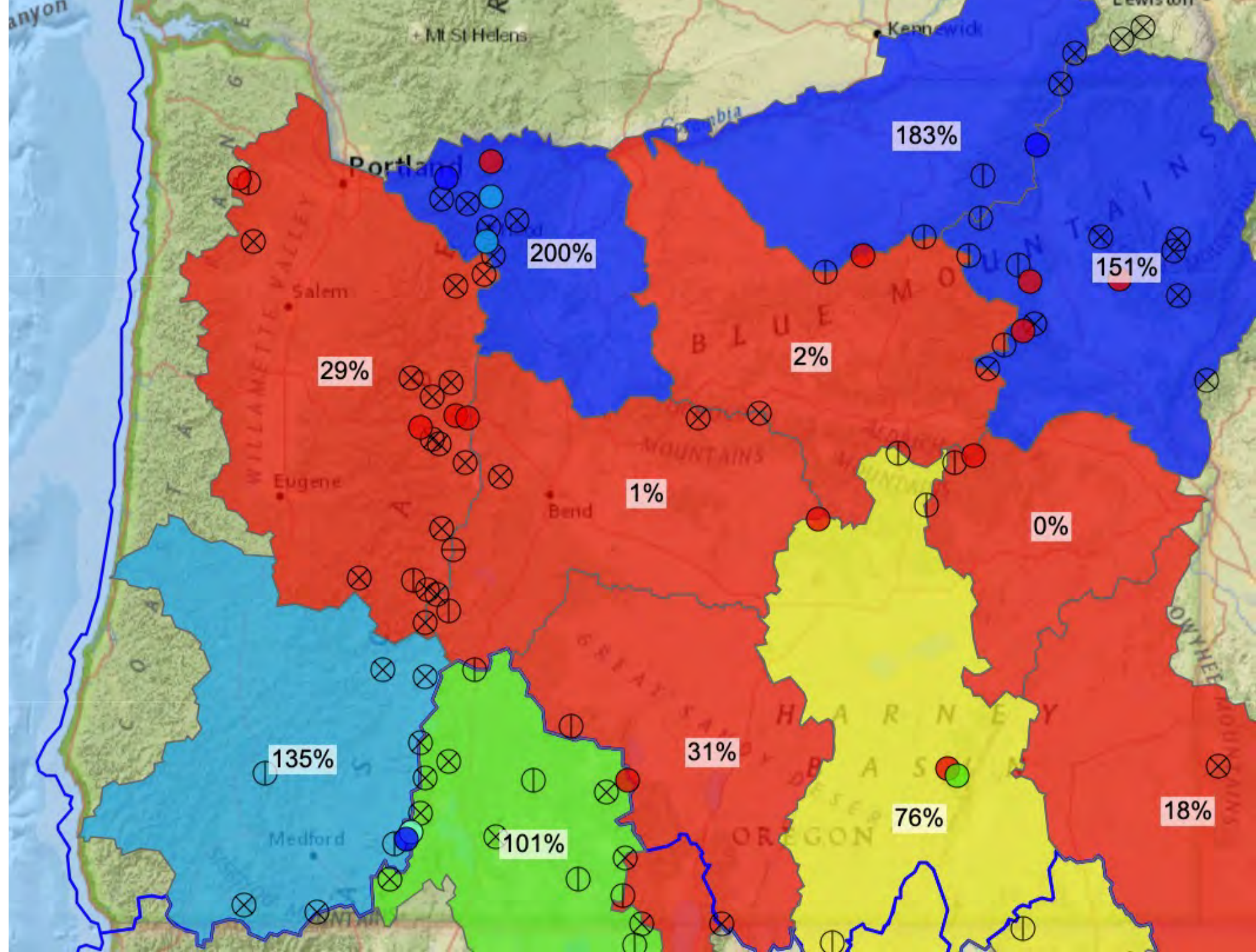
— Region (2-Digit HUC)

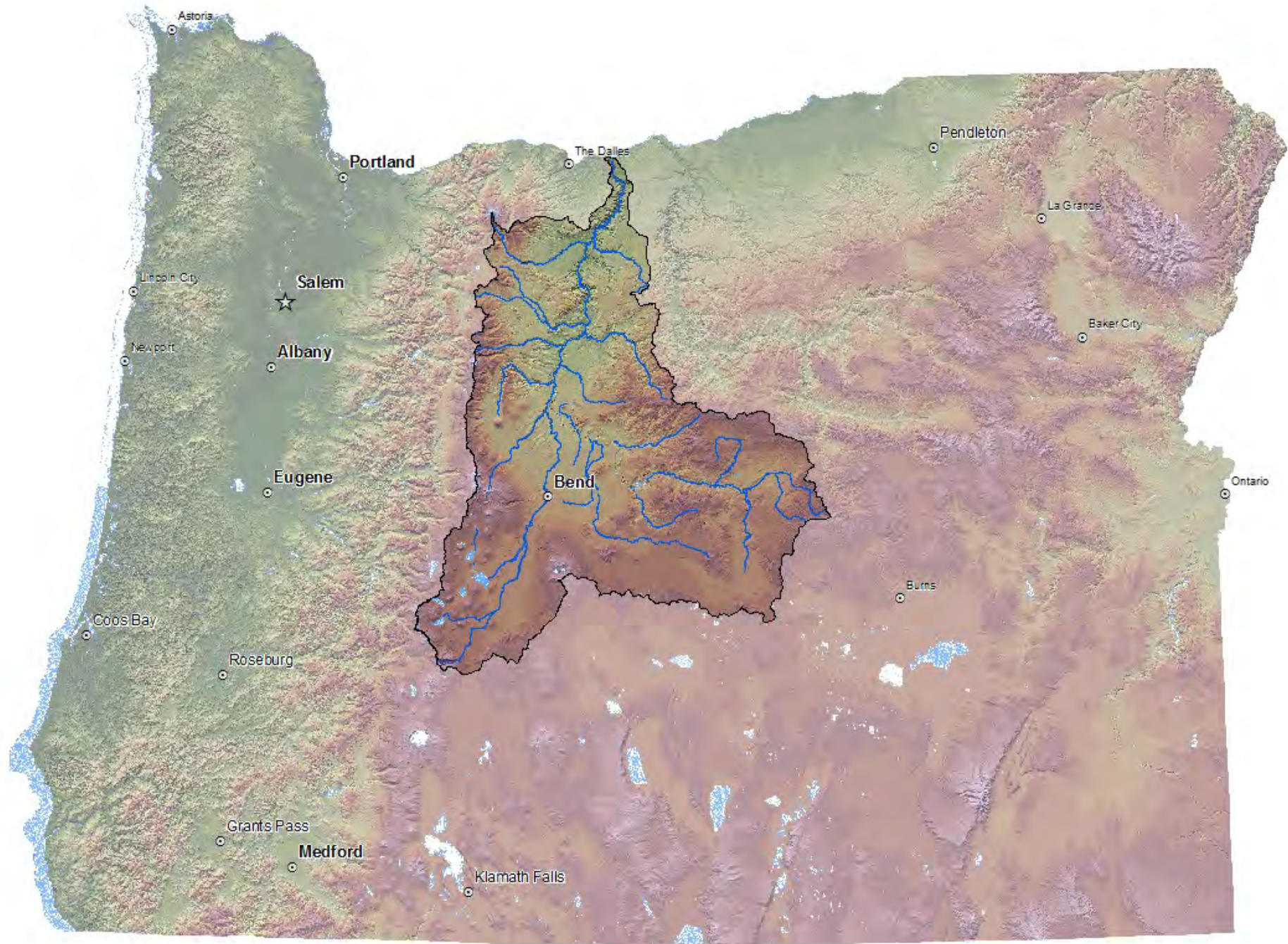
— State Watersheds

Sites with less than 21 years of data excluded

NRCS Natural Resources
Conservation Service

Created 12-12-2023, 02:43 PM PST

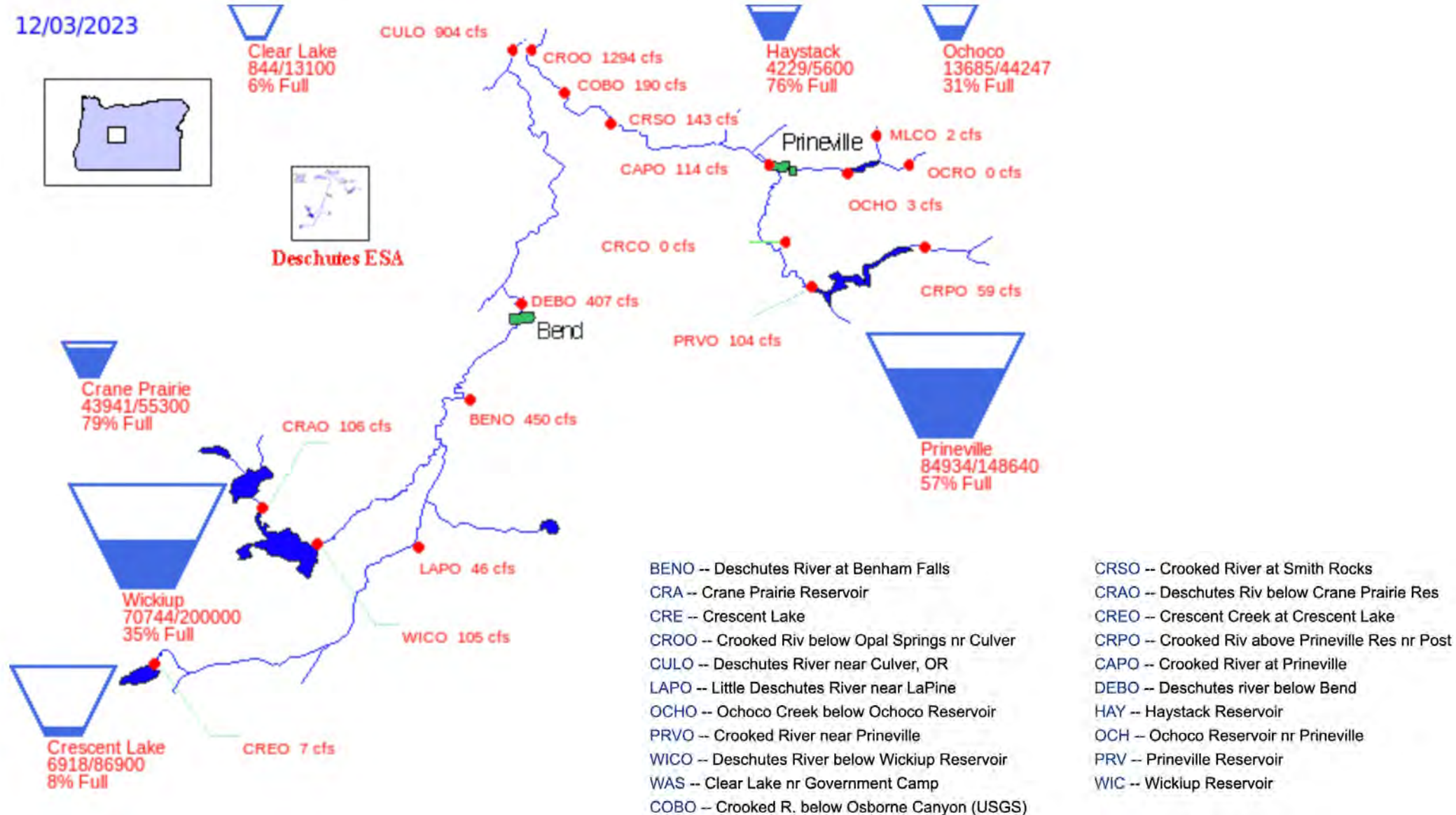




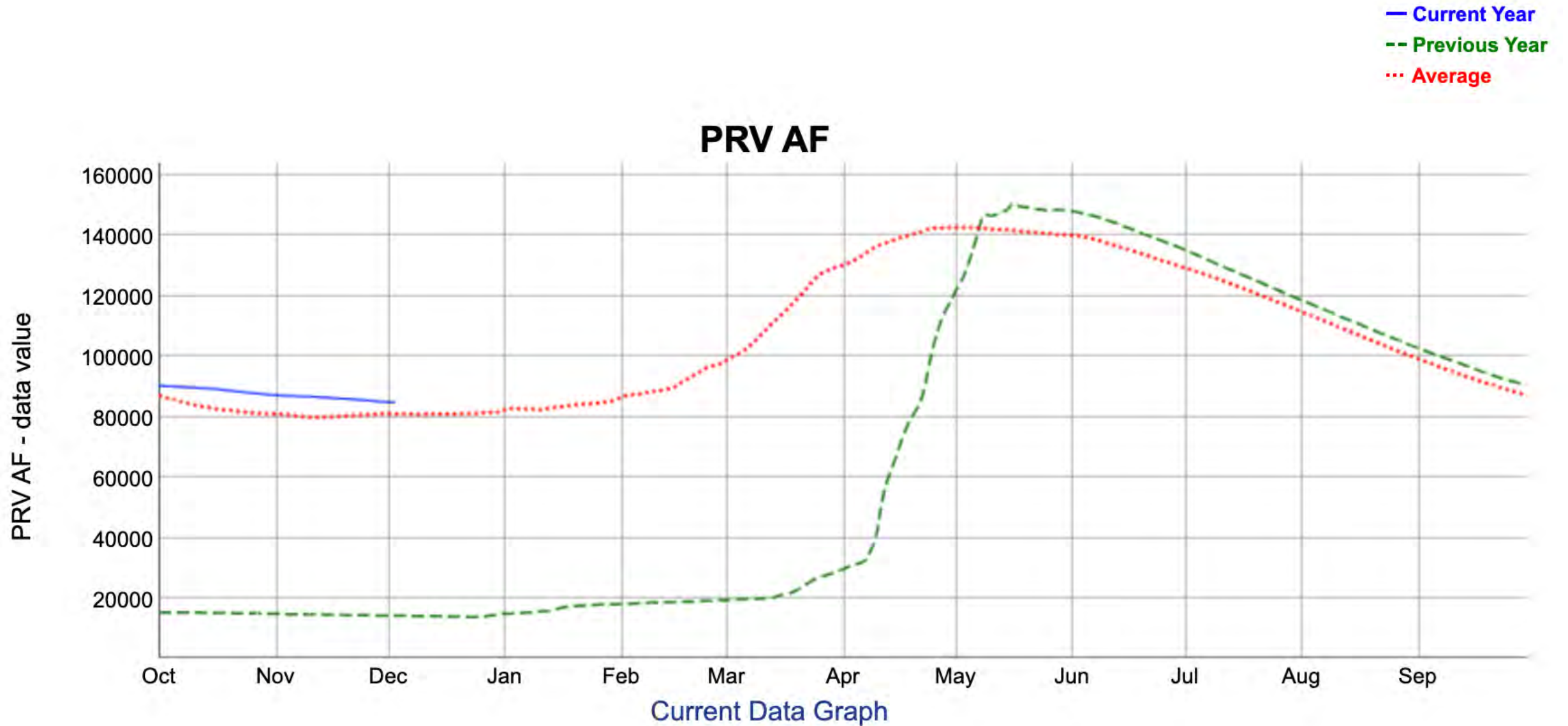


US Bureau of Reclamation, Pacific Northwest Region

Major Storage Reservoirs in the Deschutes River Basin



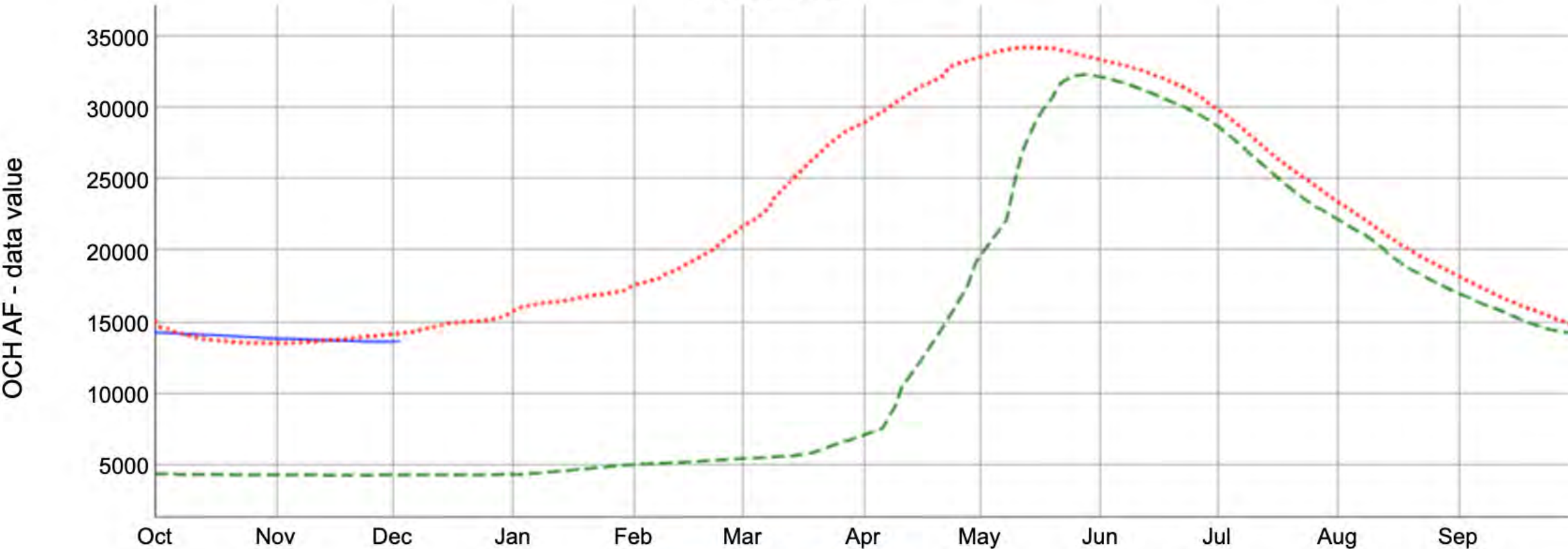
Prineville Reservoir



Ochoco Reservoir

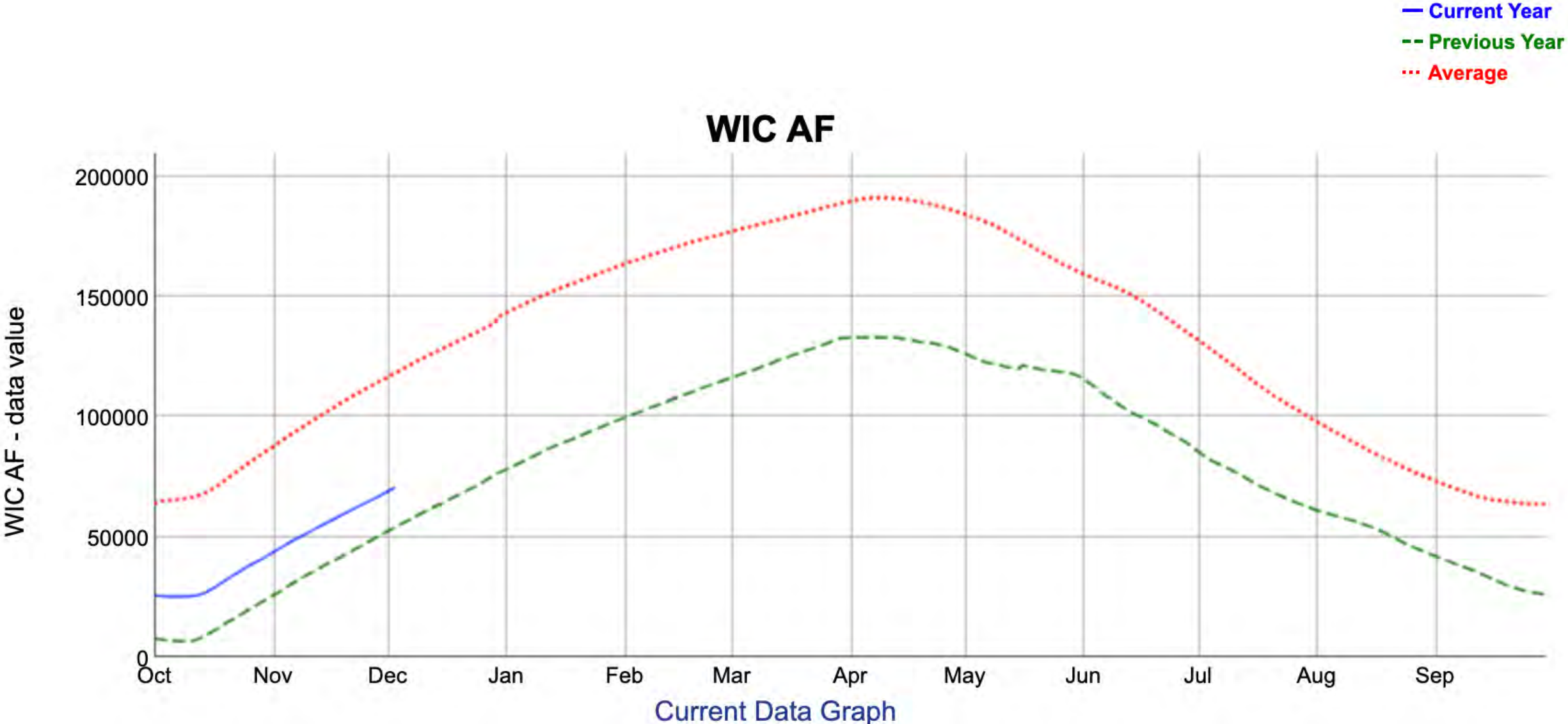
- Current Year
- Previous Year
- ... Average

OCH AF



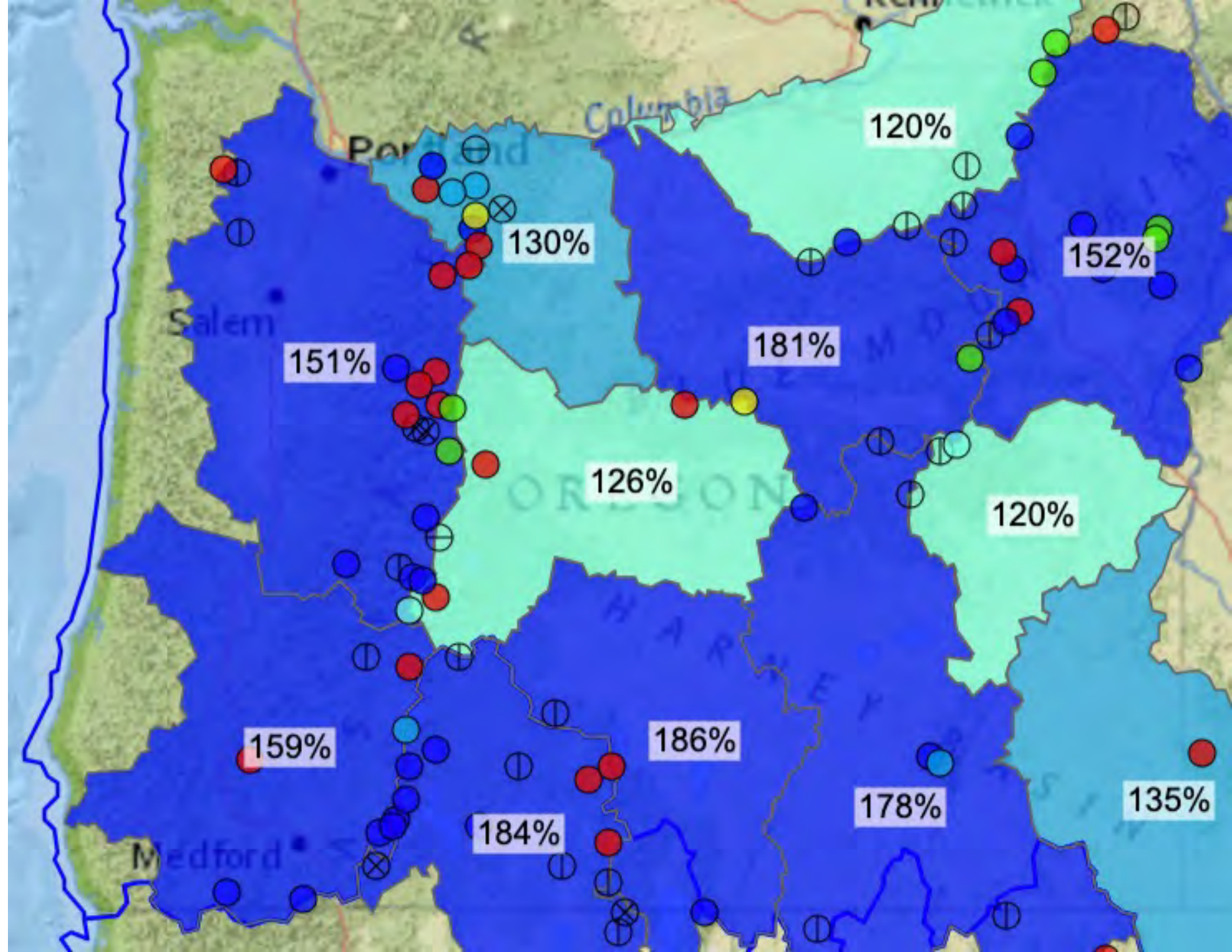
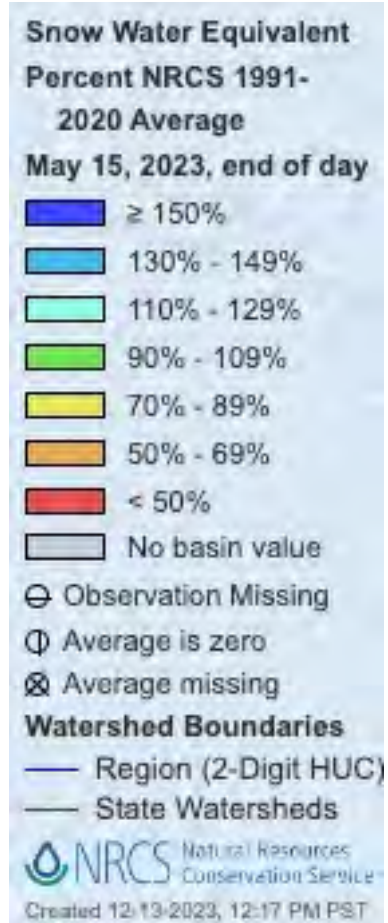
Current Data Graph

Wickiup Reservoir



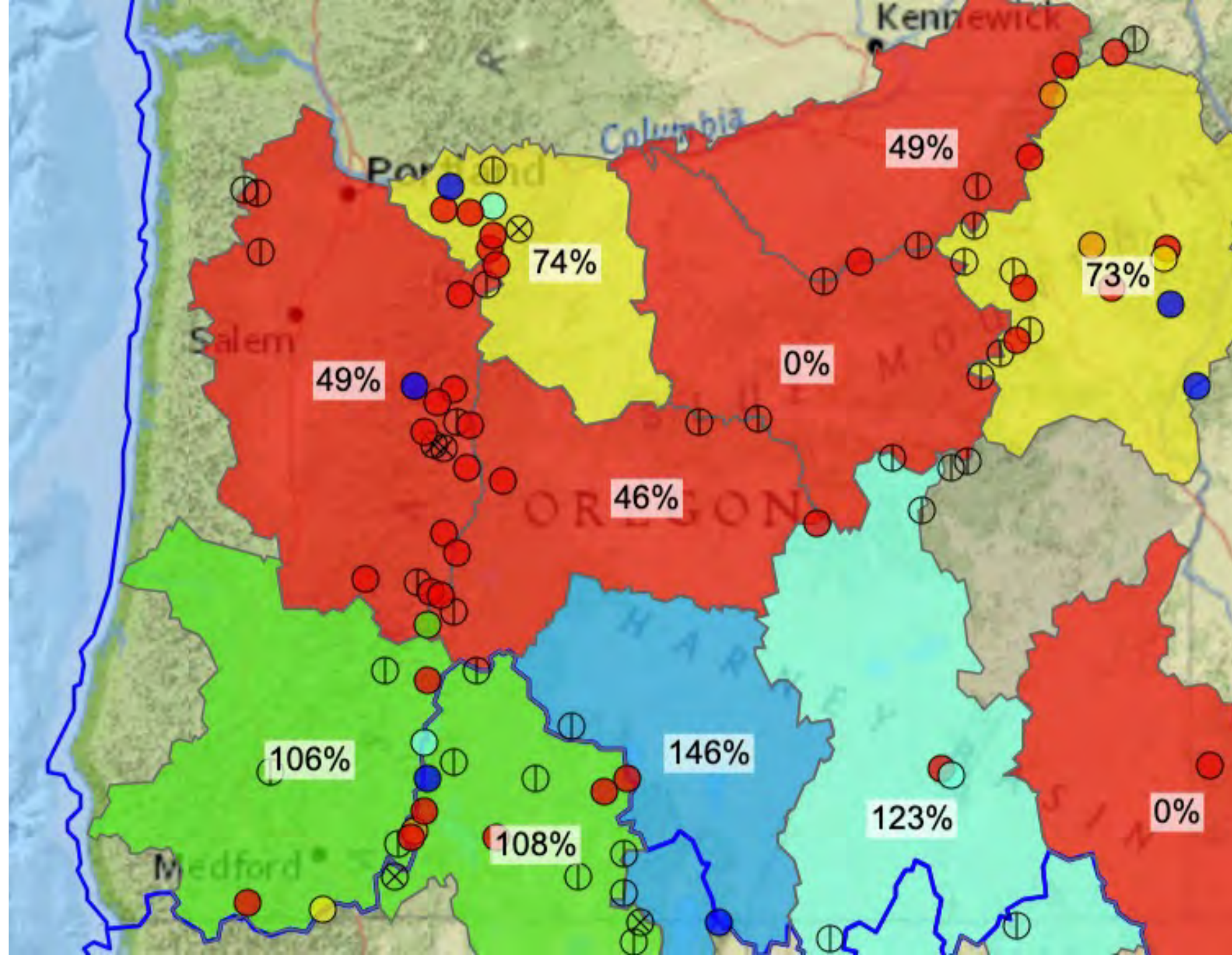
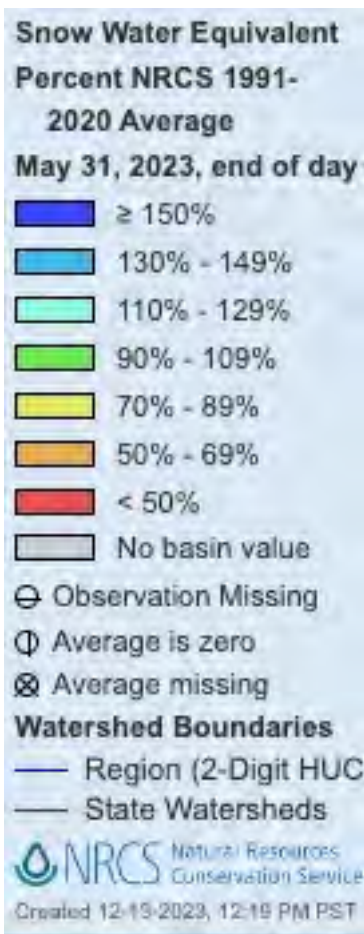
SWE

May 15, 2023

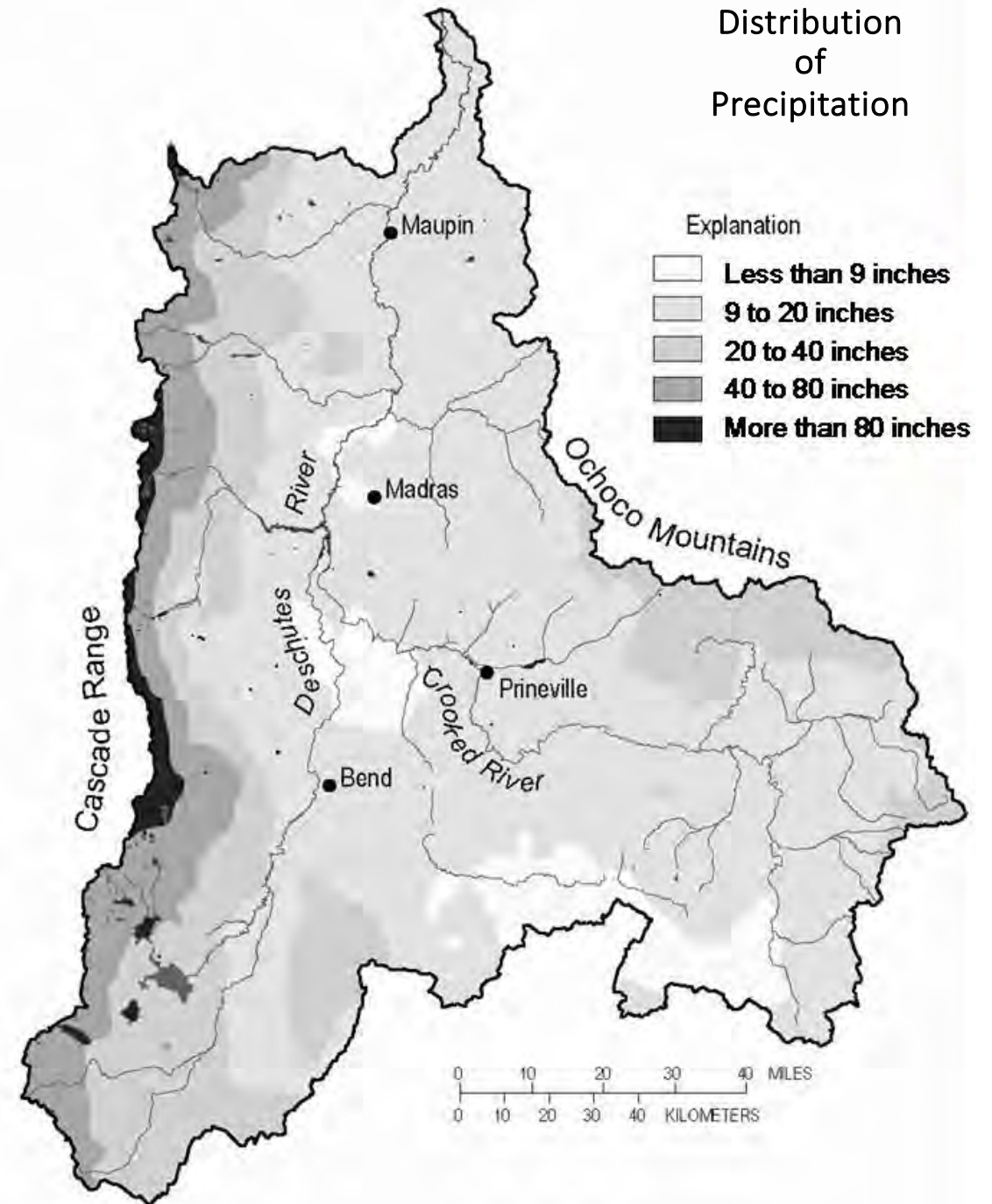


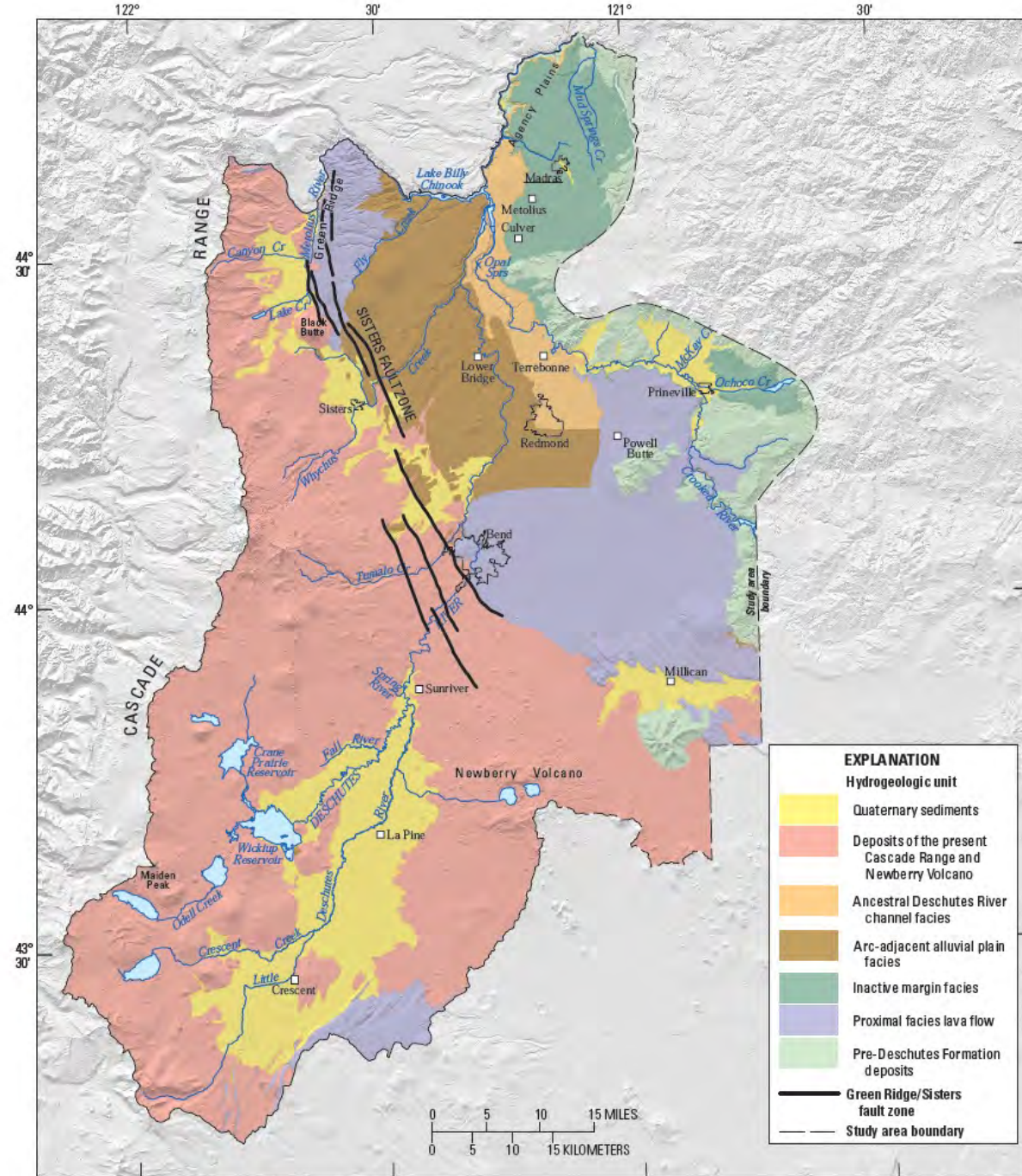
SWE

May 31, 2023



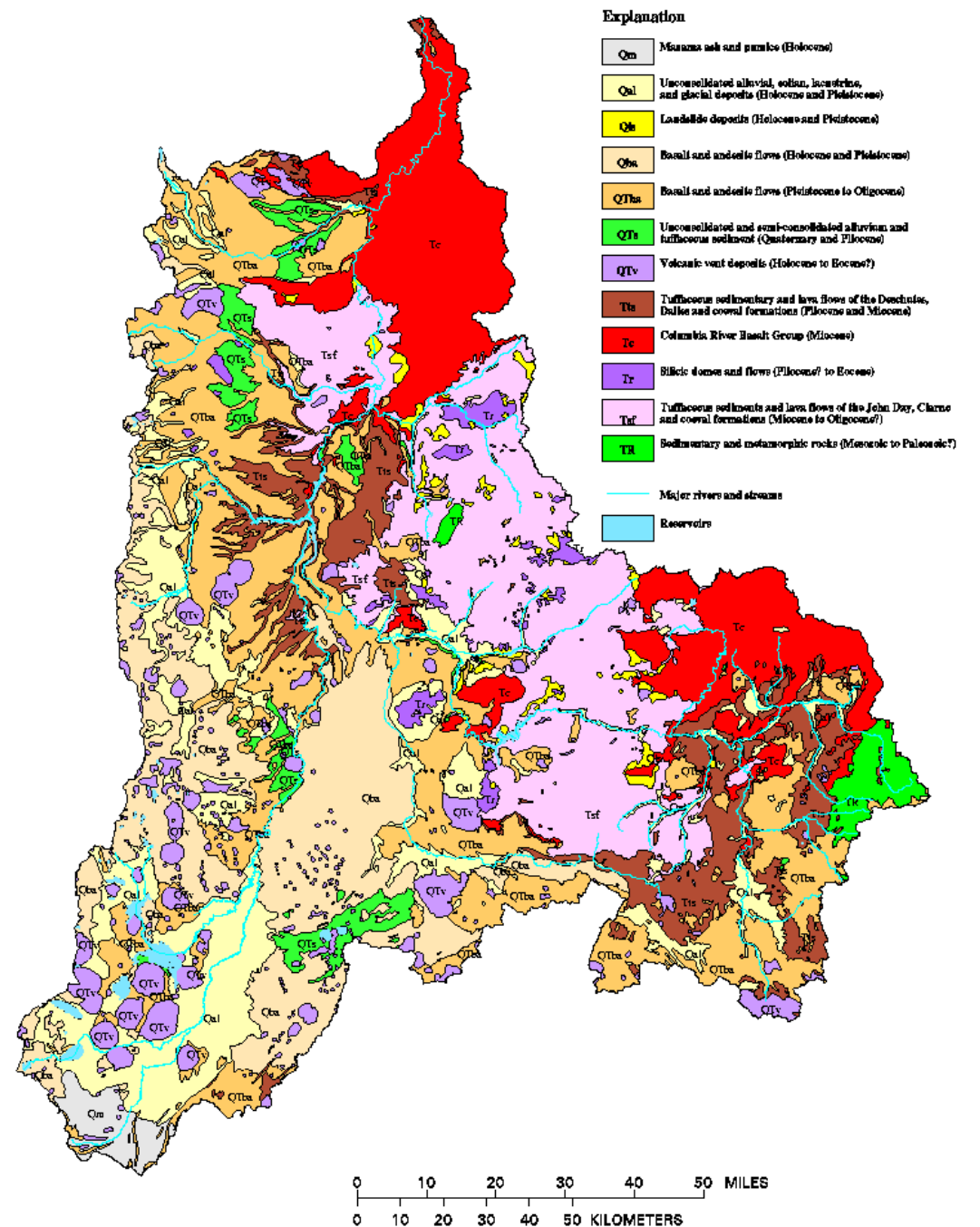
Precipitation

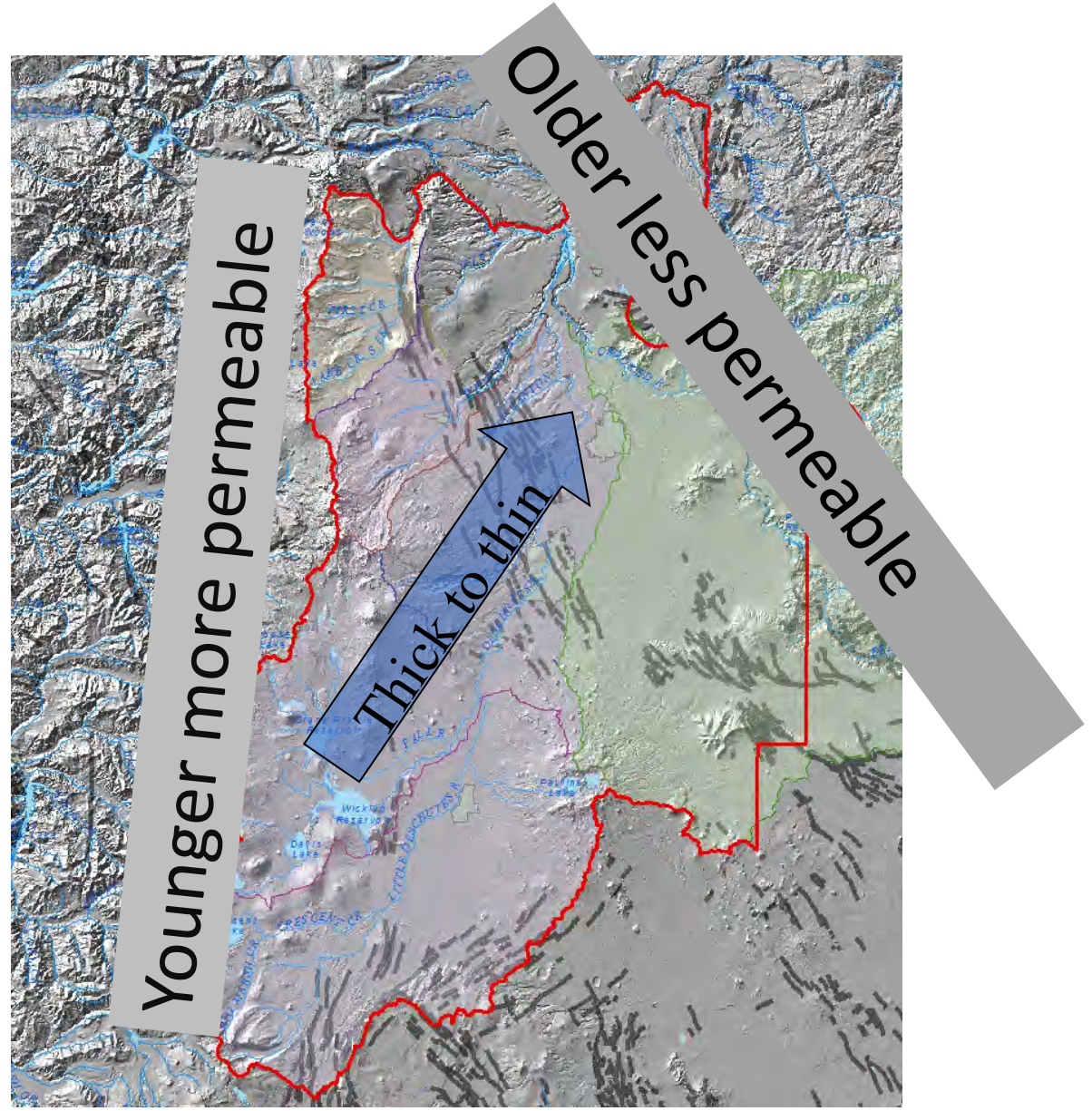
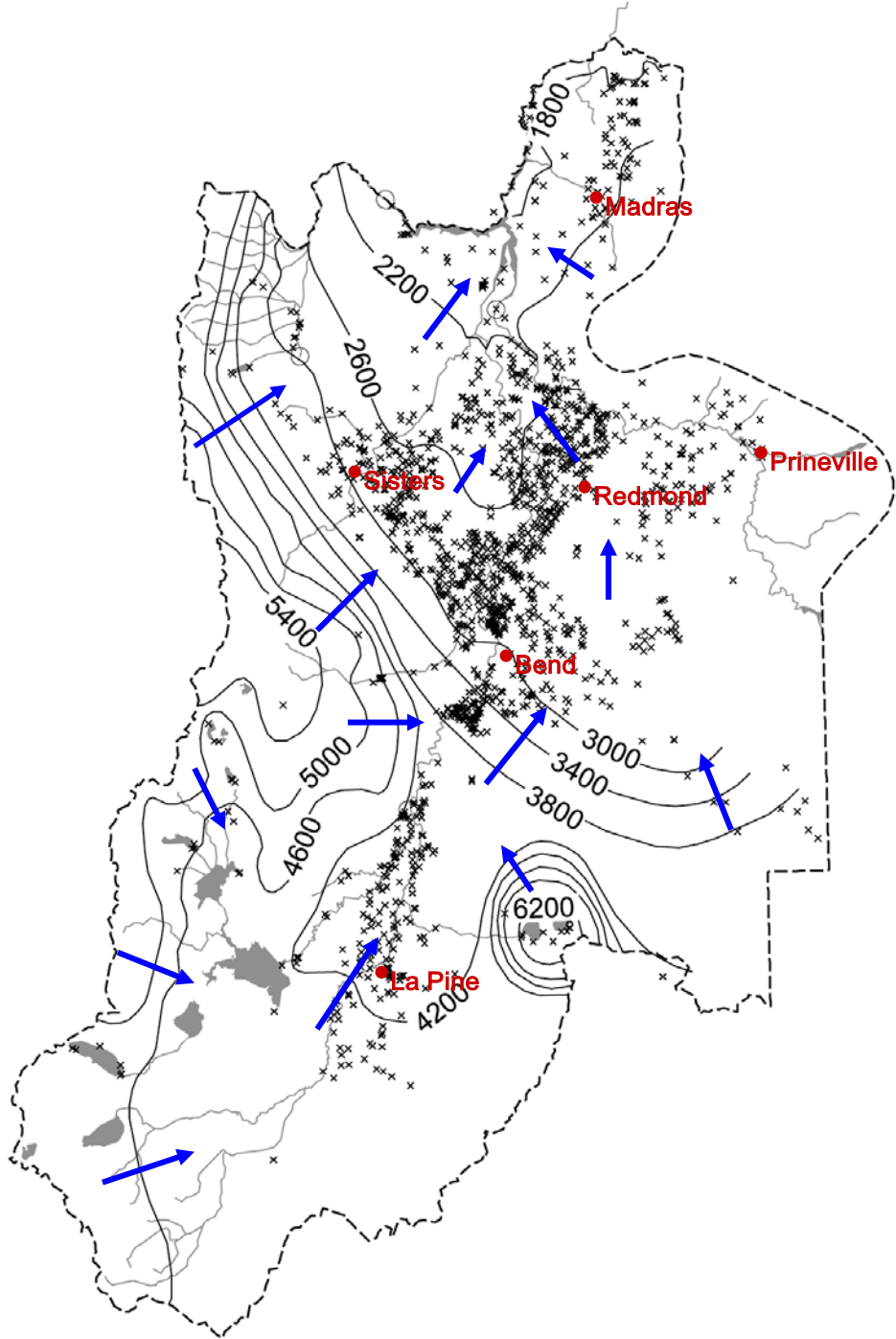


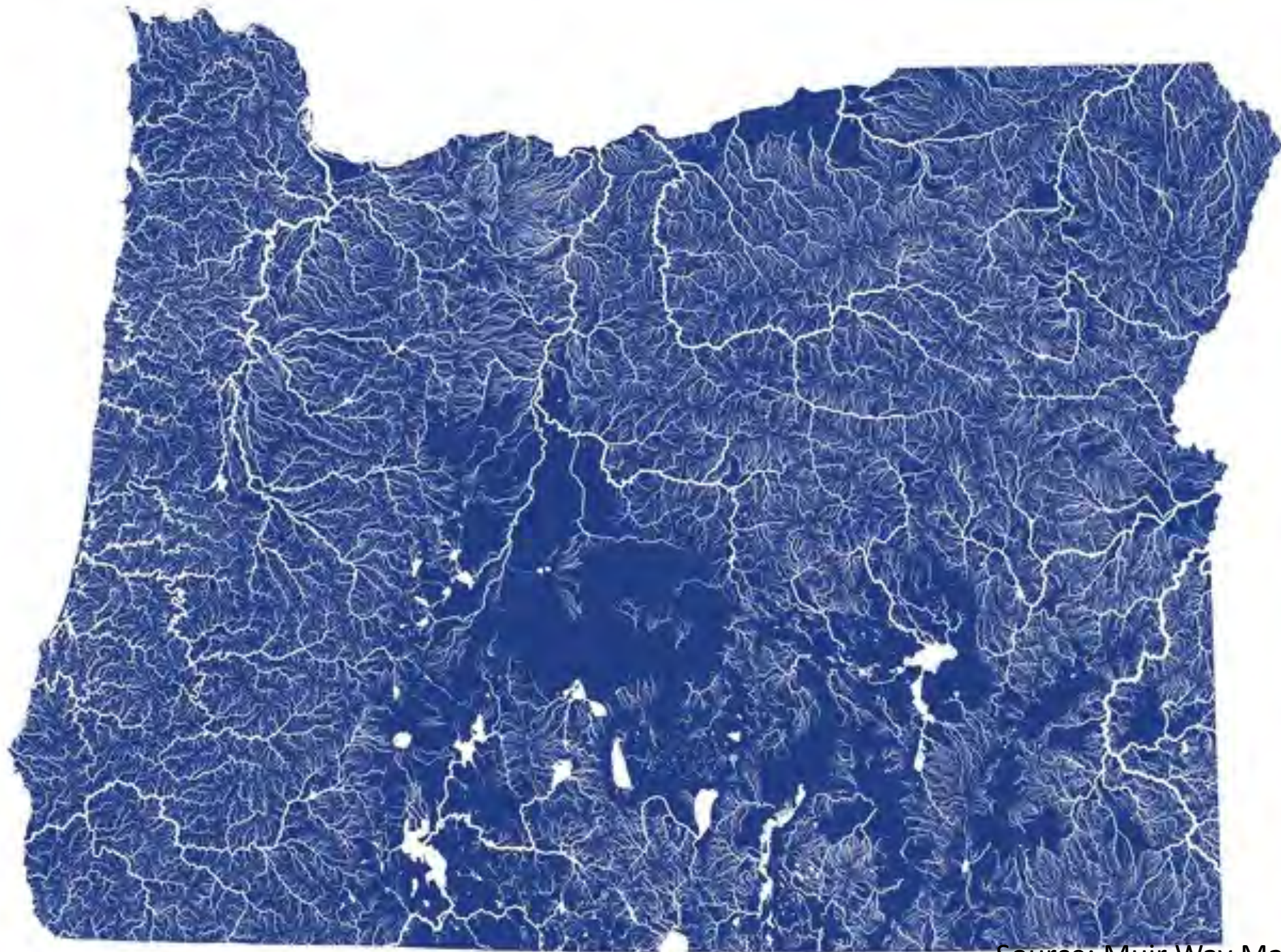


Modified from Lite and Gannett, 2002.

Generalized Surficial Geology in the Deschutes Basin

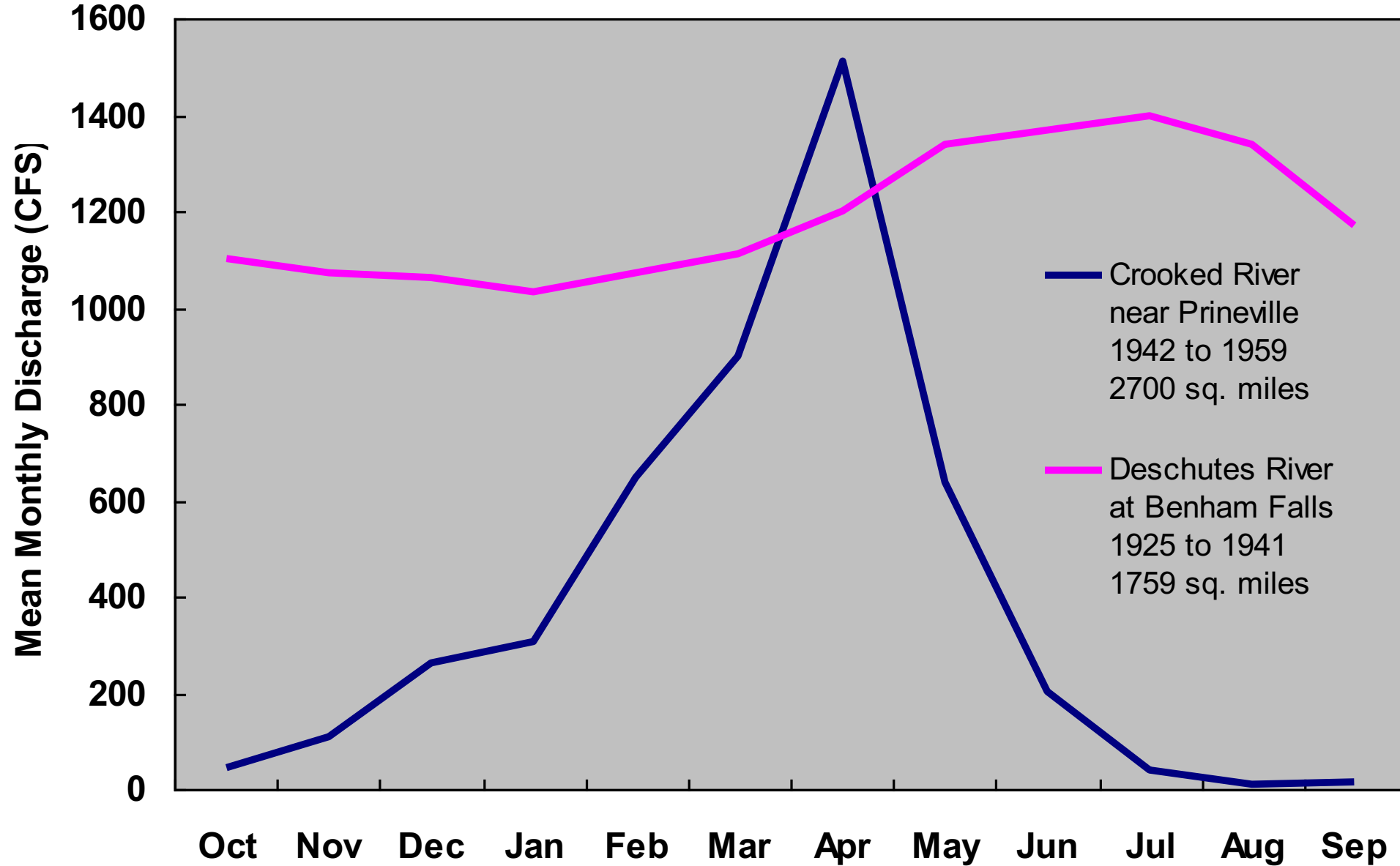




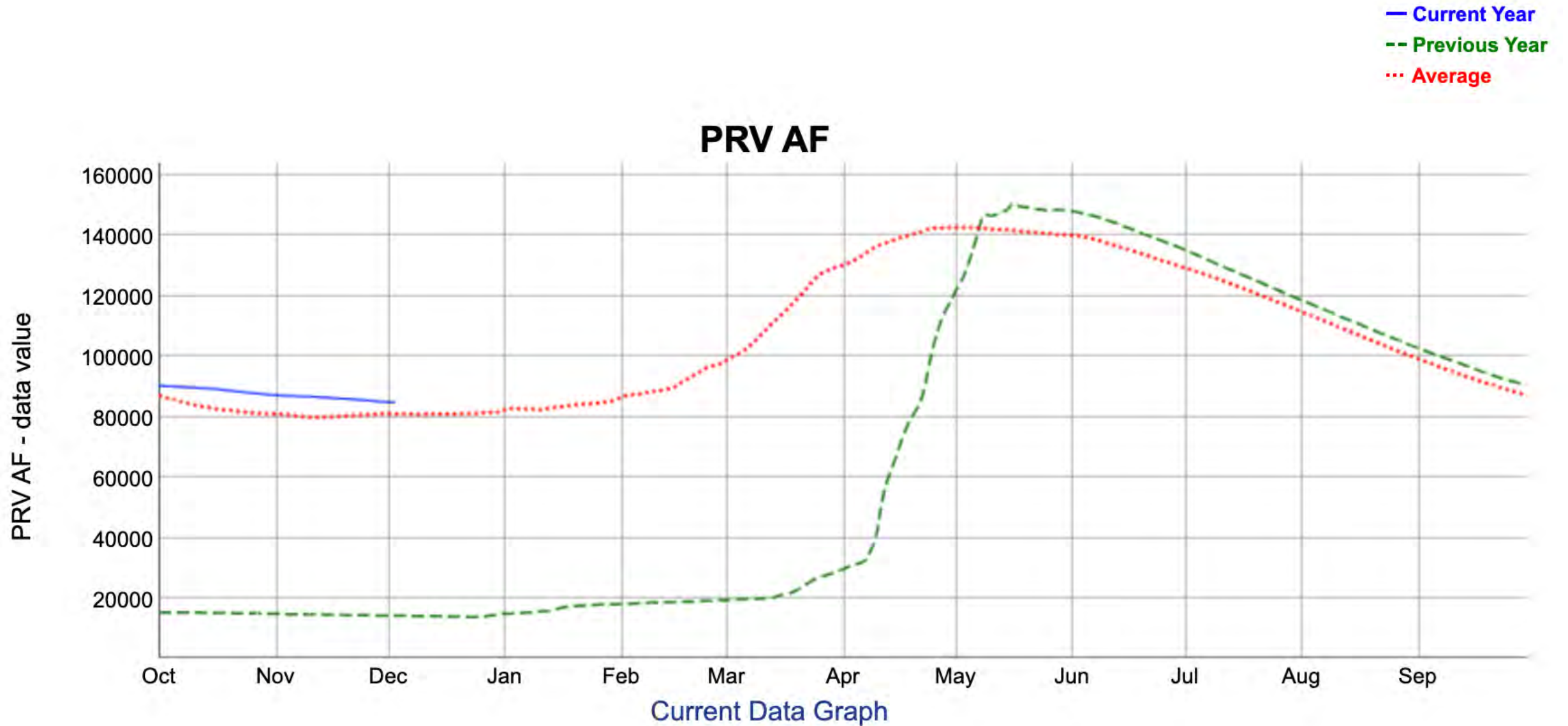


Source: Muir Way Maps

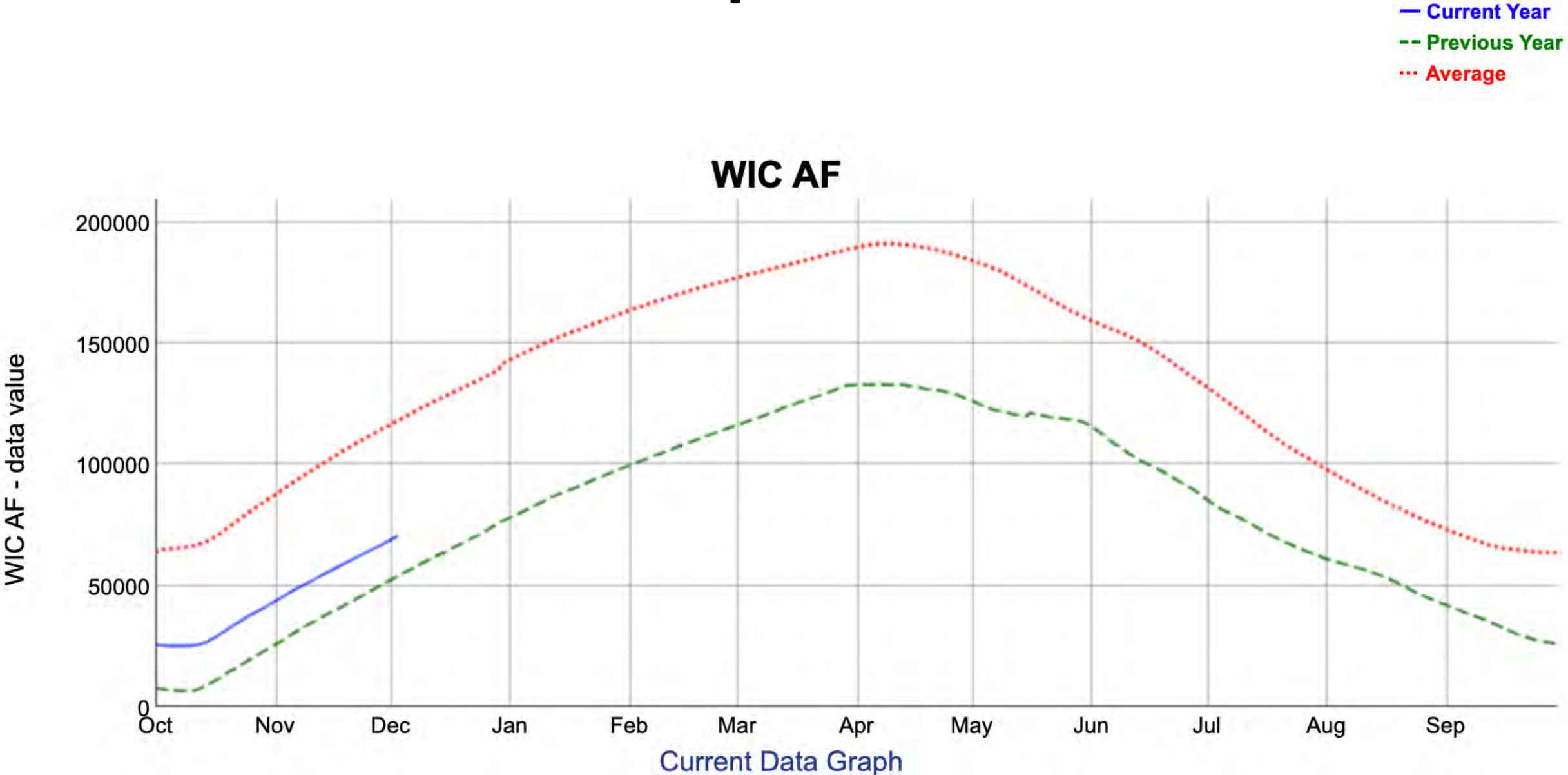
Unregulated Hydrographs—Pre-Dam



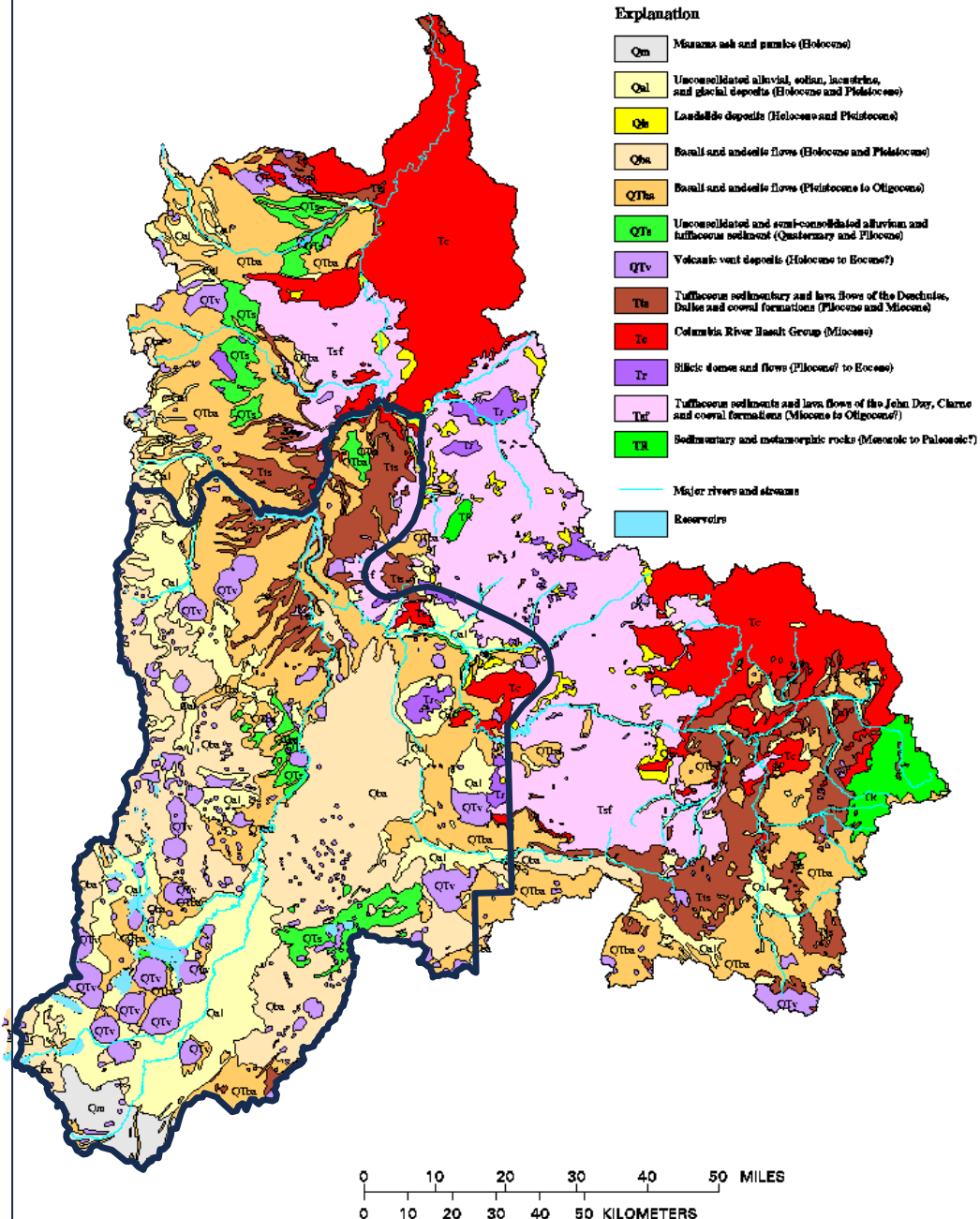
Prineville Reservoir



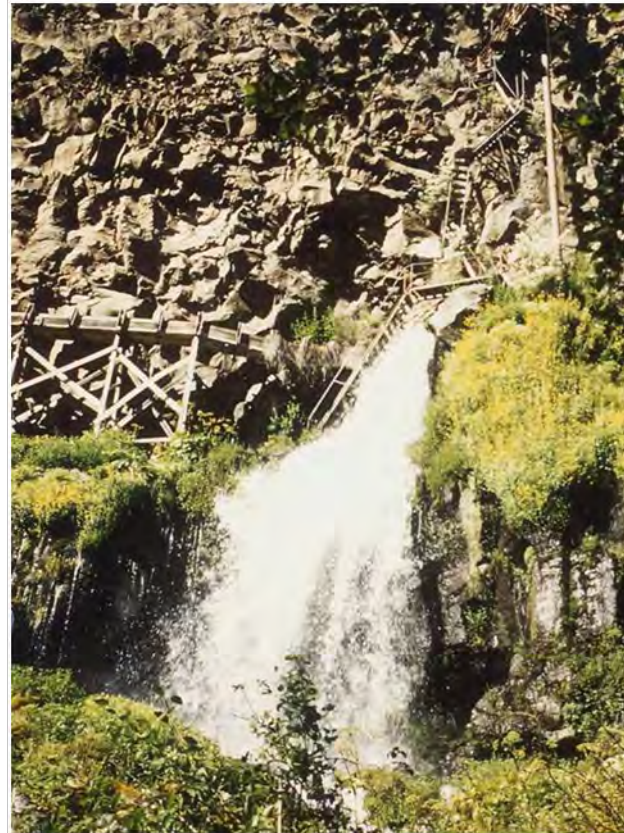
Wickiup Reservoir



Generalized Surficial Geology in the Deschutes Basin



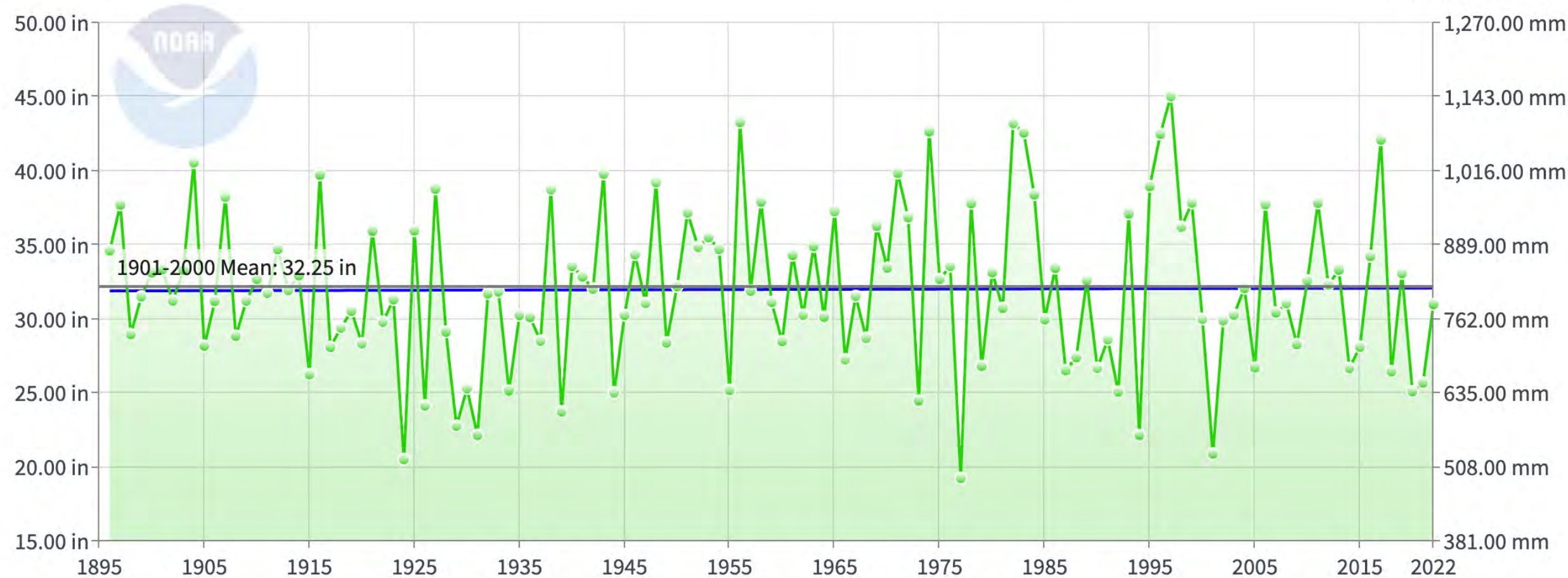
Primary source area of the Deschutes River with approximately 90% of flows at Madras coming from groundwater.



Oregon Precipitation

October-September

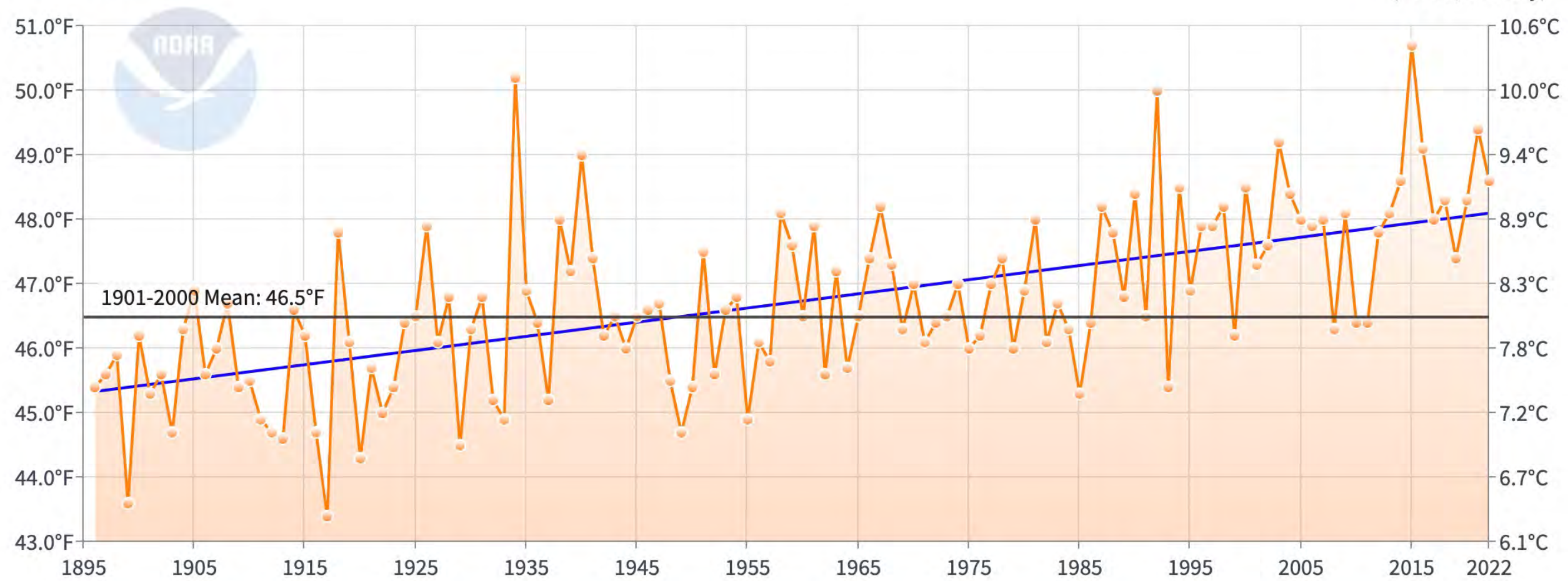
1896-2023 Trend
(+0.15 in/Century)



Oregon Average Temperature

October-September

1896-2023 Trend
(+2.2°F/Century)



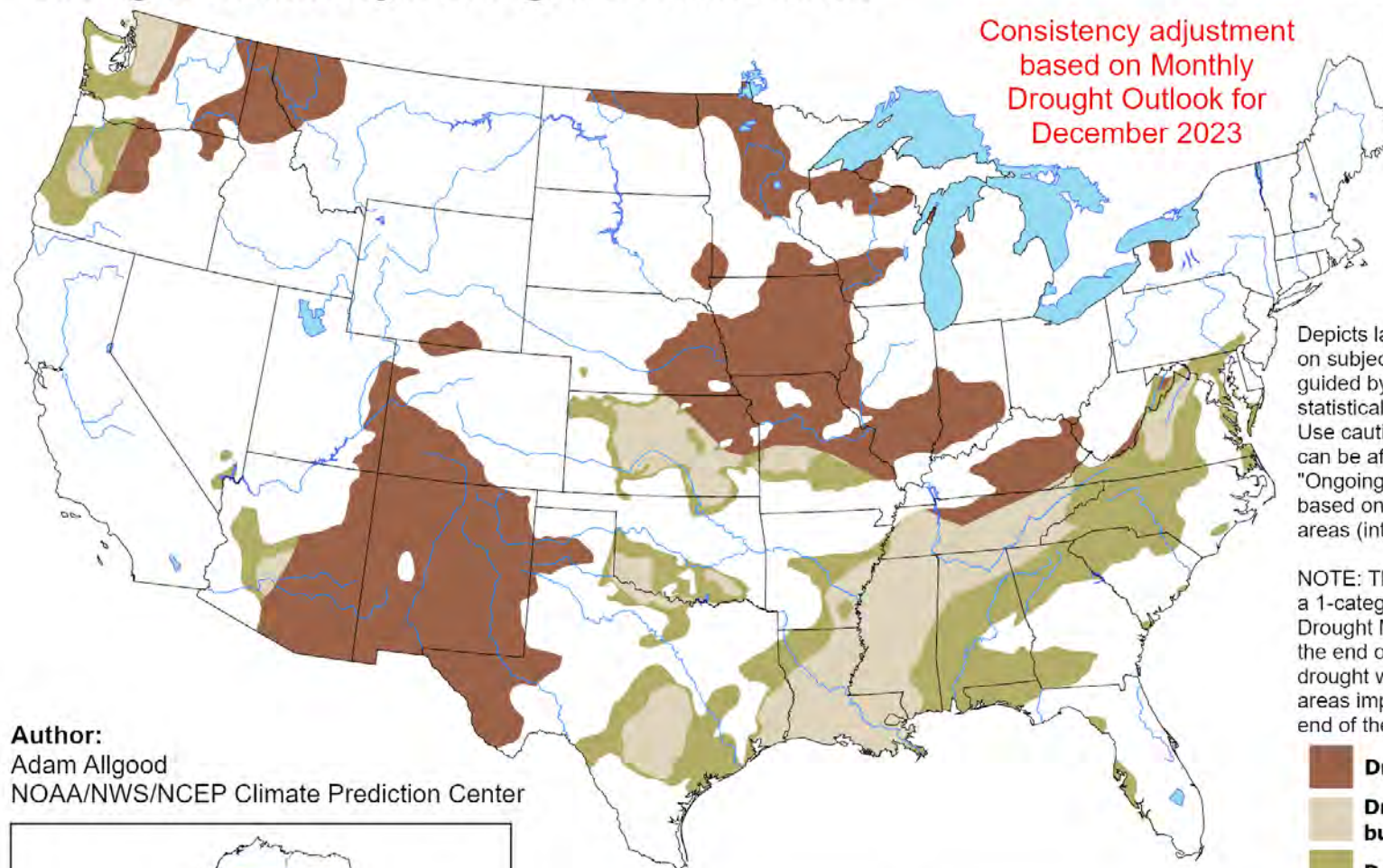
U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid for December 1, 2023 - February 29, 2024

Released November 30, 2023

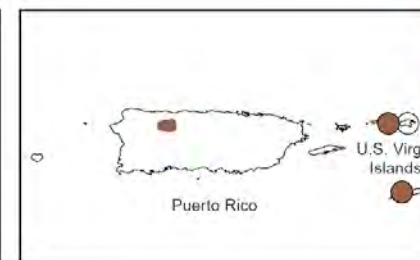
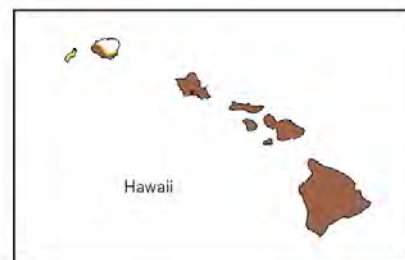
Consistency adjustment
based on Monthly
Drought Outlook for
December 2023



Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

Author:
Adam Allgood
NOAA/NWS/NCEP Climate Prediction Center

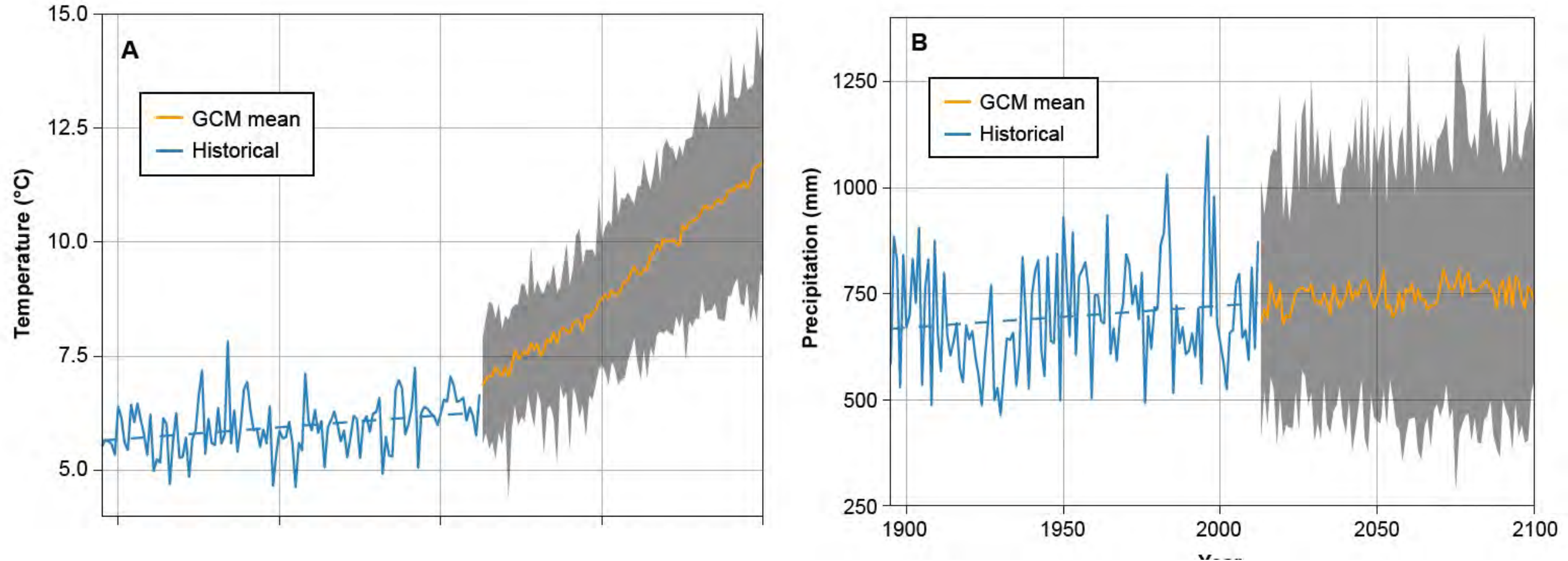


-  **Drought persists**
-  **Drought remains, but improves**
-  **Drought removal likely**
-  **Drought development likely**
-  **No drought**



<https://go.usa.gov/3eZ73>

Forecasted (Modeled) Temperature and Precipitation for South-Central Oregon



Future projections were calculated from 31 global climate models (GCM)

Building Resiliency in the Basin

- A history of success through collaboration
 - Over 350 cfs restored in key reaches
 - Increased agricultural reliability
 - Increased water security for cities



DESCHUTES RIVER
CONSERVANCY

Building Resiliency in the Basin

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- Over 350 cfs restored in key reaches
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DESCHUTES RIVER
CONSERVANCY

Collaborative Planning



Deschutes Basin

WATER COLLABORATIVE

Water for Rivers, Agriculture and Communities



The Deschutes

PARTNERSHIP

Water Transactions

Water Banking Moving water around to meet needs

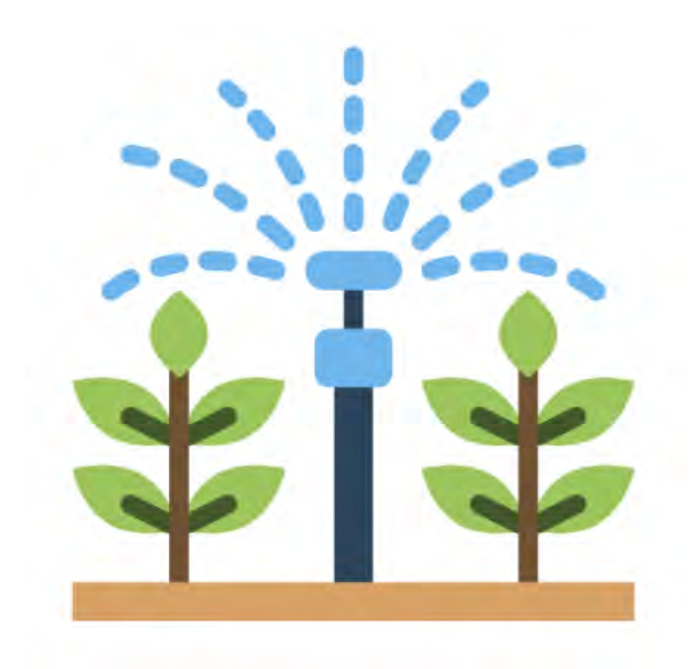


Local. Voluntary. Flexible.

Conservation Projects



Piping leaky canals
facilitates on-farm
improvements and
water banking



A photograph of a dry, cracked riverbed. The ground is parched and covered in a network of deep, irregular cracks. Patches of green and yellow grass are scattered along the edges of the dry bed. A piece of driftwood lies across the middle ground. In the background, there are more trees and vegetation under a hazy sky.

Key Takeaways

- Precipitation levels alone do not equate to drought/no drought
- The Deschutes and Crooked are vastly different rivers that react very differently to weather events
- Shifting baselines—our “averages” are shifting with time

Questions?



DESCHUTES RIVER
CONSERVANCY

Data Sources/Web Links

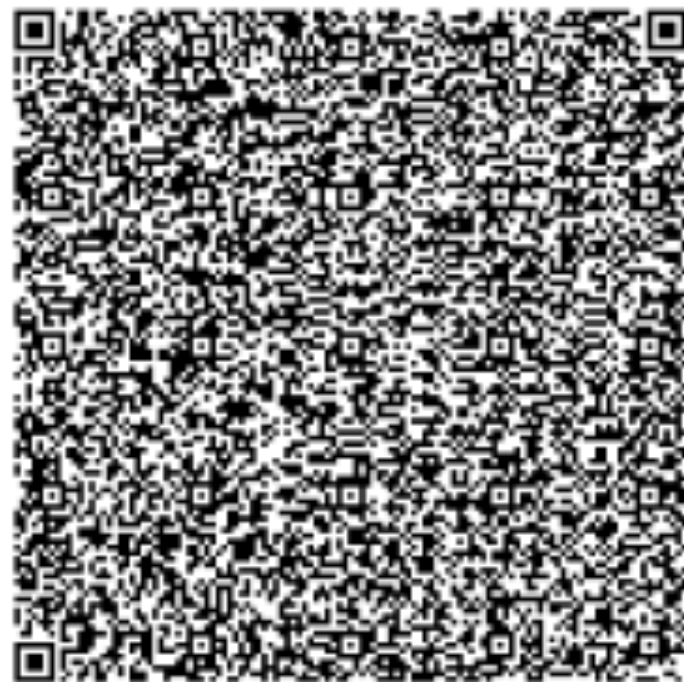
- <https://www.drought.gov/states/Oregon>
- <https://droughtmonitor.unl.edu/>
- https://nwcc-apps.sc.egov.usda.gov/imap/#version=169&elements=&networks=!&states=!&basins=!&hucs=&minElevation=&maxElevation=&elementSelectType=any&activeOnly=true&activeForecastPointsOnly=false&hucLabels=false&hucIdLabels=false&hucParameterLabels=true&stationLabels=&overlays=&hucOverlays=2&basinOpacity=75&basinNoDataOpacity=25&basemapOpacity=100&maskOpacity=0&mode=data&openSections=dataElement,parameter,date,basin,options,elements,location,networks,baseMaps&controlsOpen=true&popup=&popupMulti=&popupBasin=&base=esriNgwm&displayType=basinstation&basinType=or_8&dataElement=WTEQ&depth=-8¶meter=PCTAVG&frequency=DAILY&duration=1&customDuration=&dayPart=E&year=2023&month=12&day=12&monthPart=E&forecastPubMonth=6&forecastPubDay=1&forecastExceedance=50&useMixedPast=true&seqColor=1&divColor=7&scaleType=D&scaleMin=&scaleMax=&referencePeriodType=fixed&referenceBegin=1970&referenceEnd=2000&minimumYears=21&hucAssociations=true&lat=44.087&lon=-119.002&zoom=6.5
- <https://www.usbr.gov/pn/hydromet/destea.html>
- https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/statewide/time-series/35/tavg/12/9/1895-2022?base_prd=true&begbaseyear=1901&endbaseyear=2000&trend=true&trend_base=100&begtrendyear=1895&endtrendyear=2023



Drought.gov



Drought
Monitor



Interactive
Map



Bureau of
Reclamation
Hydromet

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